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AUTHOR Rogers, Everett M.; And Others
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ABSTRACT

This document reports results from an exploratory investigation into the adoption and use of microcomputers in the home, which involved interviews with 77 home computer owners, 19 individuals who were in the process of computer adoption, and a small sample of home computer manufacturers and retailers. The first two chapters provide information on the background of home computers and the methodology used to gather data for this project. The following chapters analyze results with regard to (1) the diffusion of innovation; (2) the innovation-decision process in home computer adoption; (3) attributes of home computers and their diffusion, including five attributes of innovations: relative advantage, compatibility, complexity, observability, and triability; (4) social networks and the pattern of home computer diffusion; (5) consequences of home computer adoption; and (6) directions for future research. Twenty-four references are cited. Appendices include a list of students involved in the research, abstracts of award-winning student papers on home computer diffusion, the adopter and non-adopter questionnaires, and response frequency information for the adopter questionnaire. (LMM)

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THE DIFFUSION OF HOME COMPUTERS

An Exploratory Study

by

Everett M. Rogers, Hugh M. Daley, and Thomas D. Wu

Institute for Communication Research

Stanford University

Stanford, California 94305

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ACKNOWLEDGMENTS

The research on which this report is based represents the efforts of a number of individuals and organizations. Foremost are the 59 students enrolled in Communication 167/267/VTS 172, "The Diffusion of Innovations," during Winter Quarter, 1982, at Stanford University (Appendix A). These students planned the research design and conducted personal interviews with 96 individuals (77 of whom had adopted a home computer and 19 of whom were in the process of adopting) and with a dozen manufacturers of home computers. Then they participated in coding and analyzing the resulting data. These students gave generously of their time because they felt this was *their* research and because the topic dealt with an important real-life issue. Their enthusiasm helped teach us some important lessons about how to mount a class research project, one that in a way became much more than just a class project.

We also thank the Hewlett-Packard Company Foundation of Palo Alto, California, and its President, Dr. Emory Rogers. Through the generosity of the Foundation, we were able to award six pocket computers to those who wrote the best student papers in our course (a summary of these six papers is in Appendix B, and a list of all student papers is in Appendix C).

The Center for Information Technology (CIT) at Stanford University provided a free computer account for each student in our course, to facilitate data-analysis and writing. CIT staff also assisted in identifying home computer users.

TRW Corporation helped make possible the publication of this report, through a gift to the Institute for Communication Research at Stanford University.

We express our gratitude to Bryce McIntyre for his valuable critique of our manuscript.

EXECUTIVE SUMMARY

The microcomputer promises to become one of the most important innovations of the present decade. The present report documents results from an exploratory investigation into the adoption and use of microcomputers in the home. Seventy-seven personal interviews were conducted with home computer owners. Other interviews were conducted with a small sample of non-owners, retailers and home computer manufacturers. We here summarize some findings of this study with regard to (1) the innovation-decision process in home computer adoption, (2) the attributes of home computers as they relate to adoption, (3) the role of interpersonal networks, and (4) the consequences of adoption.

The Innovation-Decision Process

- At the awareness-knowledge stage, most respondents received information about home computers from interpersonal channels. Interpersonal channels (54.6 percent) were mentioned more often than mass media (39.4 percent). Work associates were the most important interpersonal sources of information.

- At the decision stage, interpersonal channels were mentioned more often than mass media sources. The three most cited sources of influence—friends, work associates, and computer stores—were interpersonal.

- Interpersonal channels were more frequently mentioned than mass media at the implementation stage. Of the interpersonal channels, friends (cited by nearly 50 percent) are most influential. Among mass media sources, hobby magazines are most often mentioned as affecting one's brand choice, with newspapers and popular magazines less influential. Television is mentioned only rarely.

- The sources/channels for choosing a brand of home computer are generally similar to those at the decision stage. Adopters generally cite the same sources/channels at both the adoption-decision and the brand-decision.

- More than half of the respondents (54 percent) said that some event triggered their decision to purchase a home computer. The trigger events cited most often related to personal finances or the cost of the home computer.

- The majority of computer users are very satisfied with their home computers. More than two-thirds of the owners cited the top two levels of satisfaction on our scale of 1 to 7.

- Sources and channels change only slightly across the stages in the innovation-decision process for home computers. In general, the mass media appear to have a greater role earlier in the innovation-decision process, while interpersonal channels have the most influence during the implementation stage.

- The influence of friends changes dramatically during the innovation-decision process. They are minor sources of awareness-knowledge, but become the most important sources of information at the decision stage and in the choice of brand.

Attributes of Home Computers and their Diffusion

- The home computer is generally seen to have a *relative advantage* over traditional alternatives both in areas of home recreation and personal or work-related financial activity. Though the computer is used in the home, more than a third of the advantages mentioned by respondents were related to work or business. Many of the more expert adopters, however, saw the limitations of the home computer—in comparison to larger computers—as important negative considerations.

- The most important negative consideration, prior to purchase, was the *cost* of purchase, in spite of an average income of $35,000 among respondents.

- The importance of *compatibility* in home computer adoption is tentatively inferred from the relative earliness of adoption by individuals who had backgrounds suggestive of high compatibility. Within our sample those who were relatively earlier in purchasing their home computer were, for the most part, in scientific and technical fields.

- The home computer is seen as relatively *complex* both at the level of concept and the level of use. It is seen as having a wide range of advantages and functions, none of which may be individually compelling. More than 60 percent of our home computer owners reported problems with their home computer after purchase. Difficulties in learning to use the home computer were a major problem encountered. Next to cost, anticipated difficulties in learning to use the computer

were the second most important negative consideration prior to purchase.

- The increasing prominence of the entertainment function of the home computer is an important element of its *observability* among potential adopters. While not cited as an important reason to buy, the entertainment/recreational use of the home computer is by far the most prominent aspect of evaluations conveyed by owners to potential adopters.

- Two aspects of *triability* are important in home computer adoption: (1) accessibility for trial, and (2) divisibility for trial. Two-thirds of our respondents were able to get some experience in using a home computer prior to purchase—most commonly at their work place, friends' homes or a computer store. Accessibility for trial has increased over time: later adopters generally had more trial opportunities than earlier adopters.

- The multi-functionality and multiple component nature of the home computer contribute to its divisibility for trial, allowing the potential adopters to "try it out" on a limited basis. On average, respondents purchased one peripheral device initially and purchased an additional peripheral latter.

- Adopter *expertise* was an important factor in the evaluation of home computer attributes. Those with higher computer expertise were more likely to mention the advantages of the home computer as an aid to work and business related activities, and to report having "immediate interest" in owning a home computer.

- The number of *children* in the household of the home computer adopter was another important factor. In contrast to expertise, there is a negative relationship between family size and immediate interest in owning a home computer. In general, adopters with children at home were less likely to mention negative considerations prior to purchase. They were much less likely to report cost as a factor in their selection of a home computer brand.

Social Networks and the Pattern of Home Computer Diffusion

- Computer owners knew, on the average, about five home computer owners before their purchase. Fifty-nine percent of our home computer adopters, however, knew fewer than three other adopters before their purchase. Ten percent knew more

than nine.

- Home computer owners talked to an average of nearly 13 people within the previous month about their home computers. Owners exhibited their computers to an average of about five persons within the previous month.

- Home computer owners encouraged an average of eight other persons to buy a home computer.

- People who talk about their computers with other people are likely to display their computers as well. Persuasion activities were not linked to the other forms of communication.

- Determinants of verbal communication are: the influence of friends on the owner's decision to adopt, personal income, and use of the home computer for entertainment.

- Determinants of exhibiting one's computer to others are: inexperience with the home computer before purchase and use of the home computer for entertainment.

- Determinants of persuasion are: usage of the home computer for database access, immediate interest in adoption, and the amount of computer experience a owner has before purchase.

- Computer owners receive mainly positive messages from other computer owners before their purchases. Positive messages outnumber the negative ones by two to one.

- Despite the positive messages they receive, computer owners report many problems with their own computer. Forty-eight of the 77 respondents (64 percent) report they encountered problems with their home computer. Computer owners took an average of about one month before they felt comfortable with their computer.

- Evidence for rapid diffusion of home computers in the future comes from a number of sources: a rise in the number of sources/channels of influence, in the number of brands known, and in the effect of interpersonal influences, and a decrease in the length of the adoption period.

- However, home computer diffusion (as evidenced in our sample) may be taking place within a restricted stratum of the total population. The extensive social networks that exist among the early adopters of home computers may represent a homophilous group, with similar backgrounds and attitudes. Evidence for homophily comes from the demographic composition of our sample, of which the majority have advanced degrees, and over half have professional occupations. Other, more extensive surveys of home computer owners also reveal a generally homogeneous upper-income stratum.

Consequences of Home Computer Adoption

We discussed the consequences of home computer adoption in terms of the types and extent of home computer usage, and the impacts of home computer use for the individual and the family.

- The home computer was most commonly used by our respondents and their families for entertainment and word processing, categories that were each mentioned by more than 50 percent of the respondents. More than 30 percent reported some home computer usage for business management, database access, and home budgeting.

- About 60 percent of our home computer owners reported use of the home computer by other family members.

- In most households, the home computer was used between 5 and 20 hours per week. Average reported usage was 17.1 hours per week. About one quarter reported average usage in excess of 25 hours per week.

- Over half of our respondents reported an increase in their home computer use over time, while 14 percent reported a decrease in use.

- Entertainment dominates children's usage of the home computer almost to the exclusion of other uses.

- Use of the home computer for work-related word processing, business management, and database access is positively associated with personal income. Personal income is also associated with a greater number of user applications.

- The most salient impacts of the home computer were: (1) facilitating work, (2) increasing awareness and knowledge of computers and the computer world, and (3) altering the recreational pattern of owners and their families.

- More than two-thirds of our home computer owners found the home computer to be a time-saving device, while a third found it to be a money-saving device.

- Forty percent of our home computer owners reported decreases (averaging one and a half hours per day) in their television viewing, subsequent to their home computer purchase, while only three percent reported increased TV viewing.

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INTRODUCTION

Personal computers are "wheels for the mind."
Trip Hawkins, Division Product Manager
Apple Computer, Inc.

The purpose of this report is to describe the results of a class project on the diffusion of home computers that was conducted in Winter 1982 at Stanford University. In several respects, this research project was unique.

This investigation is one of the first comprehensive studies of the diffusion of home computers in the United States to be publicly reported.* Undoubtedly other studies on the diffusion of home computers have been carried out, but the results are available only to corporate sponsors.

We devoted considerable effort to formulating a personal interview questionnaire that was administered by the students and teachers of our course, Communication 167/267/VTS 172, to a nonrandom sample of: (1) 77 adopters of home computers, and (2) 19 potential adopters who were at some stage in the process of adopting home computers. These questionnaires are provided in Appendices D and E of this report. They may represent the most important products of our research; we hope they will be useful to future researchers.

Finally, although the results of our research project are tentative because of the limited size and representativeness of our sample, they nevertheless suggest hypotheses about the nature of the innovation-decision process for home computers, the characteristics of adopters, and the consequences of adopting this innovation.

We, the teachers and the 59 class members, offer this research report in hopes that it: (1) illustrates certain aspects of diffusion theory applied to an important technological innovation; and (2) provides useful leads for future communication research on the diffusion of new communication technologies.

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*There are two studies in the U.S.—one by Morgan (1981) and the other by SRI International (1981)—and one in Japan (Yasuda, 1981).

BACKGROUND ON HOME COMPUTERS

A *home computer* (or personal computer) is designed to be purchased, owned, and operated by an individual, as opposed to an institution such as a business, educational organization, or government. A home computer is personal in that its use is intended for the owner (and perhaps his/her family, friends, and acquaintances). Home computers are referred to also as "microcomputers" because microprocessors are employed in their central processing unit. Microcomputers are usually distinguished by lower cost and limited computing capacity (1) from "minicomputers," which are used mainly for scientific and business purposes and which are considerably higher in cost, and (2) from "mainframe" computers, which are much higher in cost and which are usually owned by large organizations.

History of Home Computers

In 1946, the world's first electronic computer, ENIAC, was switched on at the University of Pennsylvania's School of Engineering. ENIAC filled a large room, contained 18,000 vacuum tubes, and consumed enough electric power to drive a locomotive. Today, a computer with equivalent capabilities fits in one's pocket, costs less than $100, and runs on flashlight batteries.

And miniature computers are everywhere. Each consists of a computer on a silicon chip approximately the size of a fingernail. Or a corn flake. Or the letter "O" on this page. Technically, it is called a "microprocessor," a diminutive-sized processor of information. There are one or more silicon chips in some cameras (if manufactured in the past couple of years), to set automatically the light and distance. One can also find these tiny computers in late-model autos, where one of their functions is to optimize the efficiency of carburetor and ignition timing; another microprocessor can override your pressure on the car's brakes, so as to prevent skidding on slick roads. And these helpful little technical slaves are an essential element in heart pacemakers, hearing aids, digital watches, and in "smart" household appliances like waterheaters, where they function to save energy. The same type of microprocessors are found in every missile, tank, and modern armament. The 2 percent of U.S. households with a home computer will find one or more microprocessors acting as the heart and brains of the machine.

Welcome to Computer Talk

End-user: The individual or organization that utilizes an item of computer equipment, software, or operating system. The end-user typically operates a program written by computer programmers and interprets the results of the program. The end-user may be considered to be the end-point of the computing process.

Terminal: The keyboard (which looks much like a typewriter) and usually a screen that is used by the end-user to "interface" with the computer. A terminal is "dumb" if it only serves as a connection to a mainframe and lacks its own computing power. A terminal or other I/O (input/output) device is "smart" if it has internal computing power, typically graphics capabilities.

Mainframe: The largest of the three major categories of computers, usually costing at least several hundred thousand dollars today. A mainframe is so called because its components are mounted on a metal frame. IBM is by far the largest manufacturer of mainframes.

Minicomputer: A middle-sized computer in size and cost (usually more than $50,000). In appearance, a minicomputer may be several feet square and sit on a desktop; typically it is used for business or scientific purposes. Digital Equipment Corporation (DEC), headquartered in Boston's Route 128 complex, is the first (1957) and largest manufacturer of mini's. Other leading firms are Hewlett-Packard (HP) of Silicon Valley, and Data General (DG) of Route 128.

Microcomputer: The smallest of the three size classes of computers, costing from $100 up to $10,000. A micro (also called a "personal computer" or a "home computer") sits easily on a desktop, and may be as small as a briefcase. Leading manufacturers of micros are Apple Computer Inc., Tandy-Radio Shack (TRS), IBM, and Commodore. The distinction between micros and minis is fading fast, as micros are becoming more powerful in their computer capacity. A "stand-alone" computer is a self-contained unit, not connected to a larger computer.

Peripherals: The various items of electronic equipment that are attached to a computer, such as a printer, modem (which allows one to connect a computer via a telephone line, so as to communicate with another computer), or a disk-drive or tape-drive (which store data and programs).

Floppy Disk: A flexible magnetic disk, the size of a 45 r.p.m. record, on which data or a program may be stored.

Program: The instructions which tell a computer what to do. Also collectively called "software," to distinguish them from the electronic hardware of the

computer.

Component: An electronic part, such as a semiconductor chip, which is used to make up a computer.

Bit: The smallest unit of information (and of computing power and storage space). Computers ultimately store all data and programs in bits, which are represented by electronic switches in its hardware, either on or off (a logical "1" or "0"). The computer memory of a micro is typically 4K, 16K, 32K, or 64K today; "16K" means about 16,000 bits of information that may be stored in the computer's memory. Actually, since bits come in powers of 2 (*i.e.*, 2, 4, 8, 16, 32, 64, ...), 16K is really $16 \times 2^{10} = 16 \times 1024$, or 16,384 bits.

CPU (Central Processor Unit): The part of the computer that reads and executes program instructions.

Microprocessor: A semiconductor chip (or a set of two or more) that contains the logic circuitry or "brains" of the computer. A microprocessor, together with memory chips, form the essential part of a computer. The microprocessor was first developed by Intel Corporation in 1971, creating a crucial breakthrough in the miniaturization of computers.

OEM: Original equipment manufacturers. The firms that buy basic components, such as semiconductors, and then incorporate them with other components to produce a specific product for consumers. OEM's often provide distribution channels for computer-related products.

Word processing: Using a computer for writing and editing, with the main advantage over a typewriter that corrections and formatting can be accomplished more easily. A word processor is essentially a computerized typewriter. Some systems only (or mainly) perform this word processing function and not other computer tasks. Wang is the leading manufacturer of such specialized word processors.

VDT: Visual display terminal (or screen) on which a page of computerized information can be viewed. Also called a CRT (cathode ray tube) terminal.

Graphics: Visual materials such as figures that can be shown on some VDT's and printers.

High-technology firms: (1) spend a relatively large amount of their budget for R & D, and (2) employ a relatively high proportion of their workforce as scientists, engineers, and other technical personnel. High-technology means firms and industries in which the knowledge base is rapidly changing. Examples are computers, electronics, drugs, aerospace, bioengineering, and lasers.

Perhaps the best single measure of status in today's information society is the number of semiconductor chips per household (perhaps in a watch or radio). The average American home probably has from 8 to 10 semiconductor chips and a very modern one probably has 15 to 18. This index of information-power is much lower in the developing nations of Latin America, Africa, and Asia, where there may be only one or two chips per household.

Most of these household electronic products are relatively new. Actually, it was 30 years after ENIAC's debut in 1947 before the microelectronic revolution really took off. In recent years the U.S. has become an information society, that is, a nation in which more than half the work force and more than 50 percent of our Gross National Product derive from collecting, processing, and/or outputting information. It was the miniaturization of computers that helped make it possible for America to change from an industrial society dependent mainly on oil, to a computerized society dependent mainly on information.

Until the mid-1970's, when the home computer burst on the American scene, computers were owned and operated by The Establishment: government, big corporations, and other large institutions. These big computers (called "mainframe computers" because they are so large that the electronic equipment must be mounted on a fixed frame) are mainly used for data-crunching: accounting, record-keeping, research and data-analysis, banking, and airline ticketing, for example. But thanks to the technological innovation of computers-on-a-chip, by the mid-1970's it became possible to produce a very small computer, one that would sell for only a couple of thousand dollars. At that price, millions of Americans could afford one.

At first, in 1975, these small-size personal computers were thought to be only a hobbyist's plaything. The Altair 8800 could be purchased at a few computer stores, which were beginning to spring up in large cities. The Altair kit cost about $400, but a user had to spend another $2,000 or so for peripheral equipment. A number of Altair 8800's went out the door of the early computer stores, usually to buyers who were engineers or computer programmers. The only problem was that the Altair couldn't do anything very useful. And the number of hobbyists willing to spend a couple of thousand dollars for a computer that didn't do much was pretty limited.

But then, in the late 1970's, the computer market began to take off, thanks especially to Apple Computer, Tandy Corporation/Radio Shack, and Commodore.

These companies realized that if software programs were available, thousands, even millions, of home computers would be sold. That was a breakthrough in marketing, but the hardware technology of microprocessors had existed for several years, since 1971. And it wasn't the IBM's and CDC's and Hewlett-Packard's that pioneered in launching the home computer, nor even the DEC's or Data Generals. In fact, the two leading manufacturers of home computers did not begin with much financial strength. Radio Shack invested a grand total of $150,000 in tooling, engineering, and software to get its first successful TRS-80 Model I to market (Roach, 1981, p.159). Apple started out in Steve Jobs's garage in Silicon Valley, and was produced mainly because Jobs and his partner, Steve Wozniak, wanted a personal computer but couldn't afford to buy one. So they built their own. That was in 1975. It has since been moved out of the garage.

Although large firms like Hewlett-Packard and IBM had developed home computers by 1981, Apple rode the rising crest of home computer sales in the late 1970's. By early 1982, 1.2 million Americans owned a home computer. An estimated 2 or 3 million will be sold during 1982. Data International Corporation of Farmingham, Massachusetts, estimates this figure will jump to 5 or 6 million by 1985, representing almost 5 percent of all U.S. households.

The leaders in U.S. home computer sales today are: (1) Apple Computer, with sales of $334 million in its last fiscal year; (2) Tandy/Radio Shack, with $370 million, including hand-held computers; and (3) Commodore International, with $32 million in sales (Halpern, 1982). Apple and Tandy/Radio Shack together share about 23 percent of home computer sales, while Commodore has about 18 percent. Apple, Tandy/Radio Shack, and Commodore are the three firms who pioneered in selling home computers in the U.S. Since entering the home computer market in 1981, IBM has become a major competitor.

Aside from IBM and Hewlett-Packard, four other companies entered the U.S. home computer market in 1981: Osborne, Xerox, Fortune, and NEC (a Japanese firm). In early 1982, three more firms entered the U.S. market: Sanyo, Olivetti, and Franklin. Expected to enter the U.S. home computer market in the near future are: DEC, Toshiba, Hitachi, Corvus, and Fujitsu. At present, IBM seems to be pressing the three early leaders, in part by marketing its home computer through such retailers as Computerland, Sears, and its own chain of dealers. In addition the Japanese "invasion" of the U.S. home computer market is expected to begin late in

1982. NEC and Fujitsu have, during the past year, gained dominance in the Japanese home computer market (where about 300,000 home computers have been sold to date, representing somewhat less than 1 percent of the 40 million Japanese households). The rate of adoption of home computers in Japan is expected to reach about 1.5 percent by the end of 1982, a somewhat slower rate than in the United States.

The future battle for market share in the U.S. is expected to be fought through two approaches: (1) struggling by computer firms for dealer chains; and (2) bringing out new products. For example, Apple Computer is currently developing four new models: (1) the Super-II, a remake of the Apple II; (2) the MacIntosh; (3) the Lisa; and (4) the Yoda, a low-priced computer at about $500 (Halpern, 1982). One sign of the tremendous explosion in the number of computers being sold today is that one company, Commodore, expects to produce about one million home computers during 1982. Other firms will market approximately two million home computers. From the beginning of time through 1980, approximately one million computers of all kinds (including microcomputers) were manufactured.

But even if three million home computers are sold during 1982, impressive as that figure might sound, it is a relatively small percentage of the 80 million households in the U.S. For example, about 10 million color TV sets will be sold in 1982, 20 million calculators, and 40 million radios. So it is important to remember that home computers are still at a very early stage of diffusion. Sales in 1981 were about $1 billion, equal to the sales market for potato chips. In 1982, sales of home computers are expected to reach $2 billion, about half the size of pet food sales. And if the sales of home computers double again in 1983, they will almost match pantyhose in sales.

But if these sales figures seem relatively modest, it is their potential for bringing about basic changes in society that make home computers so important.

The Uses of Home Computers

At present, the main uses of home computers are for playing video games and for word processing (that is, computer-assisted typing and editing). Electronic games can also be played in arcades (similar to the pinball arcades of a previous era), in bars, and in stores like pizza parlors, or on a home television set (about one in ten U.S. households had such video games in 1982). Video games are not just glorified pinball

machines, in that they are teaching a generation of youth that computers can be easy and fun. These games are self-teaching; practically no one looks at the directions. Despite the simple controls (Pac-Man has only a joystick), an astonishing variety of complex manipulations unfold. The level of user skills that certain players gain out-runs all expectations; in fact, the newer games now have some lurking features that are designed to be found by only the best players. Pac-Man and other games are teaching a high level of hand-eye coordination to a whole generation. Whether they are teaching anything else worth learning is an unanswered question.

Word processing can be done on a home computer or at a place of work on a special word processing machine (which is more expensive than a home computer) or via a terminal connected to a mainframe computer. So home computers are not the only means available for playing games or for word processing; they are just one of the least expensive and most convenient means.

Increasingly, home computers will be utilized as a communication networking device, to link one's home with others. Or with a distant database. An important data-bank is CompuServe, located in Columbus, Ohio. Owned by H & R Block, CompuServe began servicing home computer owners in late 1979, and by mid-1981, there were about 10,000 paying customers, with an increase of 1,250 per month. Users need a modem (a telephone connection) to access CompuServe with their home computer. They pay $5 per hour on evenings and weekends, and $22.50 per hour during prime time. The monthly billing is handled through credit card accounts. CompuServe provides about 60,000 pages of information each day, including stock market reports and other financial information, such newspapers as the *New York Times* and the *Washington Post*, and airline schedules. Data-banks like CompuServe provide the daily voting records of U.S. legislators, a special kind of information that is not otherwise very convenient to obtain.

Home computers are not only a means to connect one's home with a distant database. They are also a means to allow one to work at home, using the home computer as a terminal to access a mainframe computer at one's place of work. In fact, several respondents in the present study use their home computer for this function. Some observers estimate that the number of such tele-commuters may be 15 percent of the U.S. work force by 1990. Such working at home may provide a means for mothers of small children to work on a part-time basis; it could also represent a way through which the head of the household can spend more time with his/her

other family members. On the negative side, some observers foresee the addictive quality of computers as increasing the problems of "workaholism."

Computers have been utilized in schools for many years, but only recently have computers begun to play an important role in the teaching process. This recent upsurge in using computers as "teachers" is due to the rise of microcomputers since the late 1970's. At present, 75 percent of all U.S. school districts use instructional computing, and about 50 percent of all districts own personal computers. By 1985, 69 percent of all U.S. school districts will teach about computers, and 74 percent of school districts will use computers to teach academic subjects (Brumbaugh, 1981, p. 101). At present Minnesota is the leading state in instructional computing, with 98 percent of all students attending districts that have instructional computing facilities. A new generation of American youth is now growing up with computers, just as previous cohorts grew up with television. The Apple Education Foundation has played a major role in giving personal computers to schools, following the strategy of local Chevrolet dealers in the 1960's who gave the use of a car to high school driver training classes. Steven Jobs of Apple Computer Inc. has proposed a "Kids Can't Wait" program of giving one Apple computer to each of the 103,000 school districts in the U.S., if the U.S. government will allow such a contribution to be given special tax benefits (similar to those offered for contribution of computers to universities for research purposes). Jobs's proposal, now officially called "The Educational Technology Act of 1982," seems to be gaining considerable legislative support.

Stanford University's new Sterling Dormitory complex, to be completed in 1983, contains computer outlets in every student's room. A university official in charge of the dormitory, Jan Van Houten, said, "Computer terminals will become as popular as pocket calculators by 1987." In fact, six computer terminals connected to the university's computer system will be provided in the central office of the residence system. Just as a bank of telephones once were located near the housemother's desk.

"Having a computer in a building or in an office or any place guarantees a demand for the next computer, the next computer, the next computer," one computer executive said. (Charles I. Peddle, President of Sirius Systems Technology, in Rosen Research Inc., 1981, p.131).

Will the home computer become as pervasive as the television set? We think

that it will almost certainly not be, at least in the form that we know it today. But only time will tell.

THE PRESENT RESEARCH PROJECT ON HOME COMPUTERS

Each Winter term for the past several years when Communication 167/267/VTS 172* on the diffusion of innovations has been offered, its teachers and students have planned and conducted a diffusion research project as one of the important class activities. Past projects dealt with diffusing the idea of heart disease prevention to employees of the Control Data Corporation, to faculty and staff at Stanford University, and with the diffusion of solar flat-plate collectors to California households. In January, 1982, when planning the diffusion course, we decided to conduct our class project on the diffusion of home computers.

We felt that home computers were still at a very early stage of diffusion in the United States, but that this innovation was entering a period with a rapid rate of adoption. Further, we expected that home computers were going to have an important impact on society, an effect that was already begining to be felt. In many respects, home computers were an ideal innovation for study in our course. Certainly this project captured the interest of the 59 class members who were enrolled, as few other innovations could have done. One reason for the high degree of interest relates to the varied make-up of the class: a number of the students were engineering majors, many others were in communication, and others majored in business, sociology, education, economics, and a variety of other fields. About one-third of the 59 students were from developing nations. Each of these majors and national origins contributed to the home computer diffusion project.

Another reason for the high level of interest in the project was the perceived importance of computers in affecting society. Every class member had personal experiences with the effect of computers, and knew of others' experiences.

Finally, home computer diffusion appeared to be in full sway during Winter, 1982. Magazines carried advertisements for home computers, as did television programming. Steven Jobs and the Apple computer appeared on the cover of *Time* magazine. The Japanese home computer "invasion" of the U.S. was expected to begin shortly. Class members witnessed the impact of home computers on society, since many of the home computer companies were located in nearby Silicon Valley. And

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*VTS is an abbreviation for "Values, Technology, and Society," a program at Stanford University in which the diffusion course is cross-listed, along with Comm. 167/267 (undergraduates take the course as Comm. 167, and graduate students as Comm. 267).

several of the 59 class members worked on a part-time basis for computer manufacturers: Apple, Hewlett-Packard, and Intel.

Gathering the Data

One of the major results of the project was the development of a home computer owner questionnaire on the diffusion of home computers. The questionnaire was pretested with five home computer owners. Revisions were made on the basis of these pretests and a further critique of the questions by class members. A non-owner questionnaire was also developed using a subset of the questions from the owner questionnaire.*

The 77 interviews with owners and 19 interviews with non-owners were conducted by our class members, with each individual completing from one to three interviews. The 60-item owner questionnaire was administered to the 77 respondents in face-to-face interviews, each of which lasted from 30 to 45 minutes. The questionnaire provided data on approximately 200 variables including (1) socio-economic status and other personal and household characteristics, (2) sources/channels of information about home computers, (3) details about stages in the innovation-process for home computers (such as when the respondent was first aware of home computers, the time of purchase, and the sources of influence on the respondent's decision to purchase), and (4) the impact of home computers. The non-owner questionnaire included many similar questions. Excluded were specific questions on the uses and impacts of the home computer, which were not applicable to the 19 non-owner respondents.

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* In addition to the 96 personal interviews with users and non-users, class members in Communication 167/267/VTS 172 also gathered data by personal and telephone interviews with the major manufacturers of home computers and with several local computer stores. In this data-gathering, we concentrated on learning the marketing strategies that were followed by the computer manufacturers (which audience segment they had and were aiming at, which promotional activities they followed, etc.), who they perceived as their main competitors, how their computer software was developed, and the distribution channels that each manufacturer utilized. Observation of point-of-sale behavior in local computer stores helped us better understand the role of salespeople in the diffusion of home computers. In addition, our class members gathered data from a variety of other sources: observation of children playing video games on home computers, attendance at a meeting of the Home Brew Computer Users Club in Palo Alto, and observation of the use of microcomputers in local schools.

The Sample of Owners and Non-owners

There are approximately 78 million households in the United States, and a home computer/household ratio of .0154. In other words, a probability sample of all U.S. households would entail contacting 10,000 households in order to obtain a sample of 154 home computers owners. The home computer/household ratio in the San Francisco Bay area is presumably greater than in the U.S. as a whole, but even then, contacting, say, from 3,000 to 4,000 in order to identify 77 home computer owners was not feasible.

These considerations led to our selection of an accidental (or "convenience") sample drawn from two sources: (1) personal acquaintances of the class members, and (2) members of local computer user clubs. As a result we cannot utilize statistical inference as a basis for generalizing our research results to the population of U.S. households that are computer owners.

Characteristics of Owner Respondents

The manner of our sample selection meant that careful attention had to be given to the demographic and background characteristics of our respondents in interpreting our results. Demographically, the owner respondents may be described as follows:

- **Age**: The mean is around 36, with 28 respondents in their 20's, 16 in their 30's, 26 in their 40's, and 6 in their 50's.
- **Sex**: Sixty-eight respondents are male, and nine are female.
- **Income**: The mean is $38,000, and the median is also $38,000 per year.
- **Education**: Twenty-one respondents hold Ph.D.'s, 22 have Master's degrees, 19 have bachelor's degrees, 12 have some college, and 3 respondents have a high school education or less.
- **Occupation**: Fifteen different occupational categories are represented among our 77 computer owners; 19 percent are scientists/engineers, 16 percent are in education, and 25 percent are students.

Approximately 40 percent of our respondents are part of the Stanford University community, either as students, faculty, or staff.

Our 19 non-owner respondents were not selected to represent the "average" consumer. Rather they generally possess similar social characteristics as our home computer owners. Table 1 shows that, as a group, the non-owners roughly matched the home computer owners. No individual-level analysis was carried out on the non-owner data that we collected. However, modal responses to certain questions were occasionally used in comparison with the pattern of home computer owners responses.

TABLE 1. CHARACTERISTICS OF OWNERS AND NON-OWNERS.

Characteristics	Owners (N = 77)	Non-Owners (N = 19)
1. Average age	36 years	35 years
2. Sex (percent male)	88%	53%
3. Average personal income	$38,000	$35,000
4. Formal education (Ph.D.)	28%	26%
5. Formal education (Master's)	29%	37%
6. Formal education (Bachelor's)	25%	21%
7. Formal education (Some college)	16%	11%
8. Formal education (High school or less)	2%	5%
9. Occupation (percent scientists/engineers)	20%	21%
10. Occupation (percent in education)	16%	10%
11. Occupation (percent students)	25%	21%

Analysis

The large number of questions included in the home computer owner questionnaire allowed us to explore many issues relevant to home computer diffusion. Efforts to take into account validity threats associated with our sampling strategy further complicated the analysis. We do not, in the present report, emphasize the statistical properties associated with each finding because we believe that the evaluation of their importance is largely subjective. Our approach was not to carry out definitive tests of hypotheses, but rather to generate reasonable hypotheses on the basis of prominent distributional patterns and associations. We here briefly summarize the analysis concerns addressed, the types of analyses carried out, and the criteria used in reporting results.

One of our first concerns was to assess the degree to which our sample of respondents might, or might not, be representative of home computer owners generally. To do this we compared the distributional and modal characteristics of our sample with those of respondents in two other studies of home computer users. One of these studies was conducted in late 1978 by researchers at the University of Southern California (Holmen, 1979). The other was carried out for *Newsweek* by ARBOR, Inc., in September, 1981. Our sample turned out to be very similar to those used in the comparison studies with respect to income, age, and sex. Persons with post-graduate degrees were somewhat over-represented. The student population in our sample (25 percent) was much larger than that sampled in the comparison studies. At the same time it should be noted that student owners surveyed had a wide range of academic backgrounds and many of the graduate students were only temporarily removed from the work force. We did, however, employ two stratagems to take account of the large student representation:

1. At the univariate level, while we generally documented the pattern of responses on the basis of the full sample of home computer owners, we also examined the distribution of responses with the student population removed from the sample to check for "student effect" at the univariate level.

2. At the bivariate and multivariate levels, analysis was carried out using a sub-sample of the full population of respondents with reduced student representation. Student representation was reduced on the basis of income and academic status, both of which indicated the likelihood of owner independence in the purchase of the home computer. The sub-sample totaled 65 persons, including eight students (5 percent).

Analysis activities may be summarized as follows: (1) Initial examination of the distributional properties of each variable (both categorical and continuous); (2) the use of factor analysis to reduce the number of variables for consideration at the bivariate level; (3) correlations and crosstabulations at the bivariate stage using a subset of about 30 variables (out of a total of over 200 available); (4) occasional introduction of multiple regression to sort out the various relationships indicated in bivariate analyses and to isolate the most robust predictors.

Throughout the report, a Pearson correlation or a Gamma ranging between .3 to .5 is reported as indicating "moderate" association, and any greater than .5 as indicating "strong" association.

THE DIFFUSION OF INNOVATIONS

The present investigation is based on the theory of the diffusion of innovations. We here summarize some of the terminology and main concepts used in diffusion research.

Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system. So diffusion is a special type of communication concerned with the spread of new ideas. It is the newness of the idea in the message content that gives diffusion its special character, as some degree of uncertainty is thus involved. *Uncertainty* is the degree to which a number of alternatives are perceived with respect to the occurrence of an event and the relative probabilities of these alternatives. The degree of uncertainty can be reduced by an individual obtaining information. *Information* is a difference in matter-energy which affects uncertainty in a situation where a choice exists among a set of alternatives.

The main elements in the diffusion of new ideas are: (1) an *innovation*, (2) which is communicated through certain *channels*, (3) *over time*, (4) among the members of a *social system*. An *innovation* is an idea, practice, or object perceived as new by an individual or other unit of adoption. Most of the new ideas studied in diffusion research have been technological innovations. A *technology* is a design for instrumental action that reduces uncertainty in the cause/effect relationships involved in achieving a desired outcome. Most technologies have two components: (1) *hardware*, consisting of a tool that embodies the technology as material or physical objects, and (2) *software*, consisting of the knowledge base for the tool. The software information embodied in a technology serves to reduce one type of uncertainty, that concerned with the cause/effect relationships that are involved in achieving a desired outcome. But a technological innovation creates another kind of uncertainty, because of its newness to the individual, and motivates him/her to seek information by means of which the new idea can be evaluated. We call this *innovation-evaluation information*; it leads to a reduction in uncertainty about an innovation's expected consequences.

The characteristics of an innovation, as perceived by the members of a social system, determine its rate of adoption. Five attributes of innovations are: (1) relative advantage, (2) compatibility, (3) complexity, (4) reliability, and (5) observability.

A *communication channel* is the means by which messages get from one individual to another. Mass media channels are more effective in creating knowledge of innovations, whereas interpersonal channels are more effective in forming and changing attitudes toward the new idea, and thus in influencing the decision to adopt or reject a new idea. Most individuals evaluate an innovation, not on the basis of scientific research by experts, but through the subjective evaluations of near-peers who have adopted the innovation. These near-peers thus serve as social models, whose innovation behavior tends to be imitated by others in their system.

Time is involved in diffusion in (1) the innovation-decision process, (2) innovativeness, and (3) an innovation's rate of adoption. The *innovation-decision process* is the mental process through which an individual (or other decision-making unit) passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision. We conceptualize five steps in this process: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. An individual seeks information at various stages in the innovation-decision process in order to decrease uncertainty about the innovation.

Innovativeness is the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a social system. We specify five *adopter categories*, classifications of the members of a social system on the basis of innovativeness: (1) innovators, (2) early adopters, (3) early majority, (4) late majority, and (5) laggards. *Rate of adoption* is the relative speed with which an innovation is adopted by members of social system.

A *social system* is a set of interrelated units which are engaged in joint problem-solving to accomplish a goal. A system has *structure*, defined as the patterned arrangements of the units in a system, which gives stability and regularity to individual behavior in a system. The social and communication structure of a system facilitates or impedes the diffusion of innovations in the system.

Norms are the established behavior patterns for the members of a social system. Norms are often exemplified in the behavior of the opinion leaders in a system. *Opinion leadership* is the degree to which an individual is able to influence informally other individuals' attitudes or overt behavior in a desired way with relative frequency.

A final way in which a social system may function as an element in diffusion regards *consequences*, the changes that occur to an individual or to a social system as a result of the adoption or rejection of an innovation.

Diffusion of Communication Technologies

Research has been conducted in the United States and other nations for over forty years on the diffusion of technological innovations. The results indicate that an innovation's diffusion typically follows an S-shaped curve, with a few adopters per unit of time at first, followed by a spurt in the rate of adoption as opinion leaders adopt and thus activate interpersonal networks about the innovation, and finally, a leveling-off of the curve as almost everyone in the system had adopted the new idea. Past diffusion research has also focused on the social and other characteristics of the first individuals to adopt an innovation (the innovators) versus the later adopters (Rogers, 1982; Rogers with Shoemaker, 1971).

Until recent years, however, the innovations of study were mainly in agriculture, medicine, education, and industry. During the 1980's, however, several studies have been conducted on the diffusion of such new communication technologies as home videotape recorders (VTR's), home computers, various forms of videotext/teletext, and office automation. These communication technologies have an early rate of adoption that seems to be quite rapid, and their impact on society is important. Figure 1 shows a family of three S-shaped curves for (1) black and white television, (2) color television, and (3) home computers.

One important issue here is the rate of adoption for the new communication technologies. The S-curve for VTR's in Japan and the U.S. is increasing rapidly, as is the rate of adoption for home computers. Is there a particularly rapid rate of adoption, at least in the first years of diffusion, for new communication technologies (as compared to other consumer innovations)?*

Makoto Kikuchi, Director and Manager of Sony Corporation's Research Center, stated:

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*Our thinking about these issues concerning the rapid diffusion of new communication technologies profits directly from our recent personal discussions with Professor Toshiaki Yasuda of Tokyo Denko University.

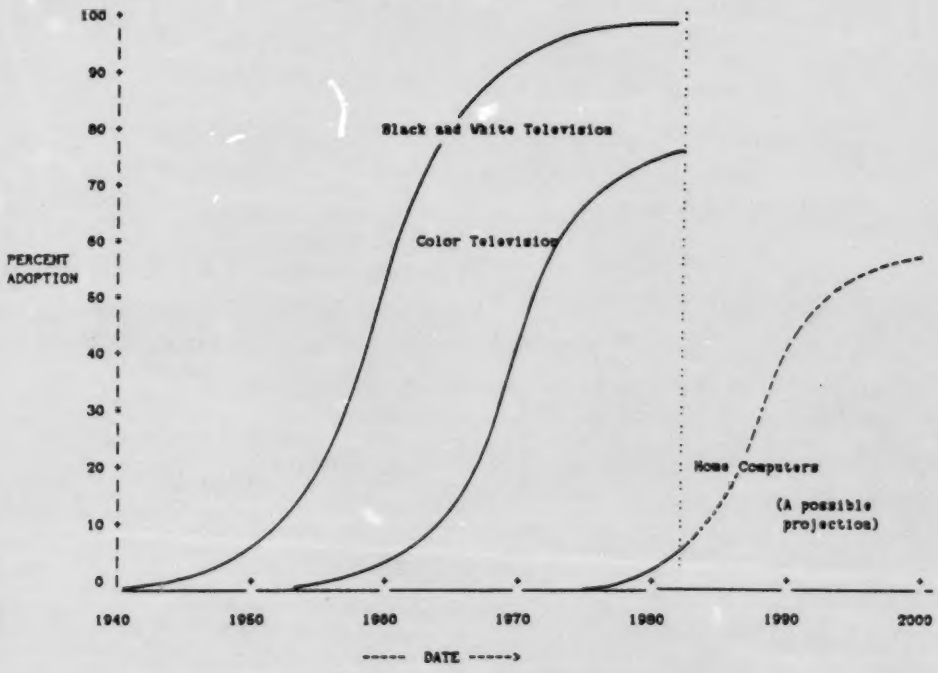
100
90
80
70
60
50
40
30
20
10
0
PERCENT ADOPTION
Black and White Television
Color Television
Home Computers
(A possible projection)
1940
1950
1960
1970
1980
1990
2000
----- DATE ----->
Note: At any particular point in time, a new communication technology has the effect of widening the knowledge gap in society, because the first to adopt are the socio-economic elites who are already the information-rich. But later, when everyone has adopted the technology, it again has an equalizing effect between the information-rich and the information-poor. But what about a technology like home computers that may not reach 100 percent adoption?

Figure 1. Diffusion Curves for the Adoption of Three Household Communication Technologies.

> Japan [is] a market of tremendous strength and scale. The booming discount trade at camera and microcomputer shows, packed to capacity, are good examples of that. Hot markets like these are something you don't find outside Japan. If such enthusiasm on the part of consumers disappears, Japanese technology may instantly die away. There exists such a hot market at home and consumers there have a high mental temperature, with everybody convinced that using something new is a virtue—these are factors of extraordinary importance.

Perhaps there is a relatively small segment of the total population of households, say 5 to 10 percent, that consistently are the first to adopt *each* of the new communication technological innovations. Maybe these innovators realize they a part of an information society, and highly value technological innovations that [illegible] them obtain information.

The Information-Rich and the Information-Poor

We wonder whether the new communication technologies are gap-widening or gap-narrowing. At issue is the degree of equality in the consequences of the new technologies. This matter is of central importance to policy-makers who are concerned about whether a relatively expensive technology will widen the knowledge gap between the information-rich and the information-poor. Certain types of knowledge (that only certain individuals will possess) can be converted to political power or to economic advantage, in some cases. For example, we have mentioned that a U.S. data-bank, accessed with a home computer and a telephone modem connection now provides daily voting records of national legislators, as well as the U.S. president's daily schedule. Such information might be especially useful to the politically-active citizen. Such detailed information cannot easily be obtained unless one has access to a home computer or terminal.

In the case of such past communication technologies as television, it seemed that the new technology, in its process of diffusion, first widened the knowledge gap in society, but eventually closed it, when everyone had adopted the innovation (Katzman, 1974). This first-widening, then-closing sequence occurs if the technology is widely adopted, and the temporary inequalities are less serious when the rate

of diffusion is rapid (as with television in the U.S.). But what about an expensive communication technology like home computers that may never become a consumer item in many households? And of course as one new communication technology begins to reach widespread adoption, another new communication technology may be creating widening gaps.

Figures 2(a) and 2(b) depict two dimensions of communication effects: (1) the first dimension, where we ask "What average or aggregate effect does a new communication technology have?" and (2) the second dimension, where the main research question is "Do certain individuals or systems experience a relatively greater effect of the new communication technology?" These questions are concerned with the new technology's potential for creating a wider gap between the information-rich and the information-poor.

Such gap-widening often occurs (unless strategies are explicitly followed to prevent it) because:

1. The new communication technologies of home computers, teletext and videotext systems, home videotape recorders, etc. in the home, and teleconferencing and electronic messaging in the office, are expensive. So only the socio-economic elite can afford them, and adopt them first.

2. Because these new technologies are computer-based information tools, an individual must be a *motivated information searcher* to use them (at least effectively). The information-rich are most likely to be the first adopters.

3. The information-rich particularly want *specialized information*, which the new communication technologies are uniquely able to provide.

In summary, we have suggested certain questions that could usefully be pursued about (1) the rate of adoption for new communication technologies (like home computers), as compared to the rate of adoption for other consumer innovations, and (2) the socio-economic characteristics of the innovators for new communication technologies. Priority questions are:

1. Is there an especially rapid rate for new communication technologies in information societies like the U.S. and Japan?

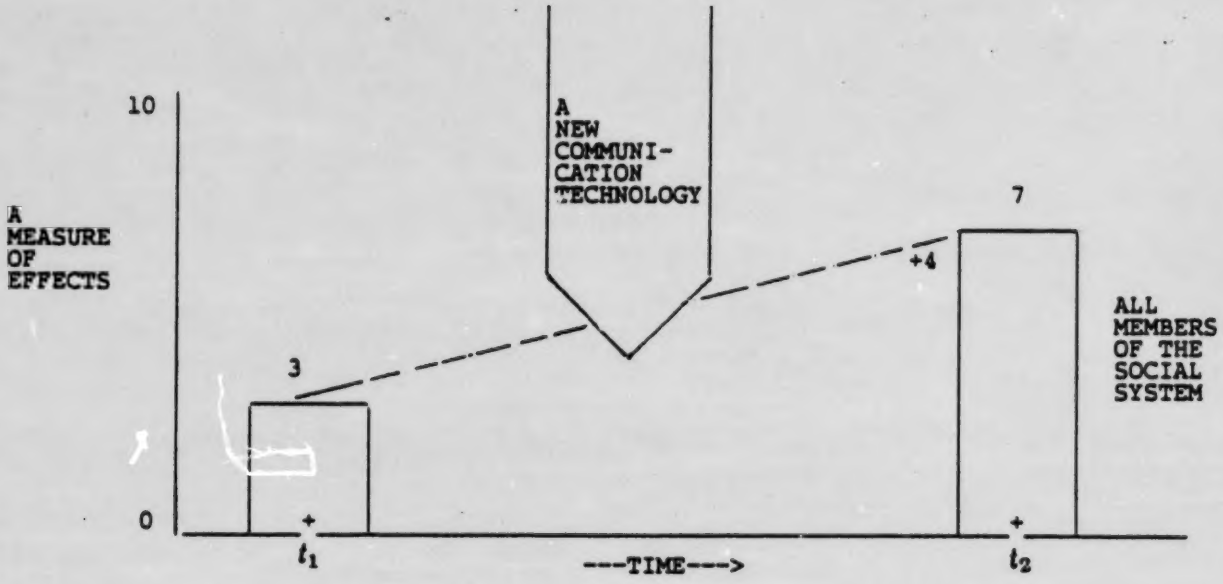

Figure 2(a). The First Dimension of Communication Effects For All Members of the System. An Average Increase of 4 Units, Measured as the Difference from t_1 to t_2.

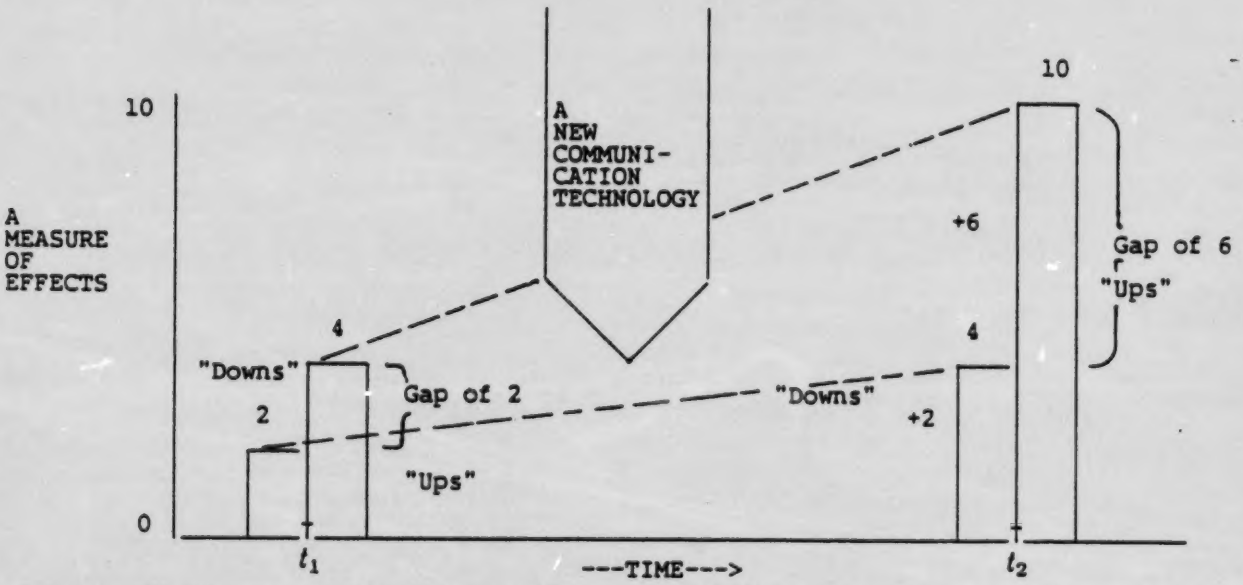

Figure 2(b). The Second Dimension of Communication Effects For "Downs" and "Ups." Indicates that the Effects Gap is Widened by the Introduction of a New Communication Technology.

Note that the "Downs" are *absolutely* better off as the result of a new communication technology (+2), but they are *relatively* worse off (as the "Ups" gained +6). So the rich get richer (informationally) and the poor get less poor.

2. Is there a "hot market" consisting of 5 to 10 percent of all households that are particularly eager to adopt new communication technologies?

3. What are the socio-economic characteristics of innovators versus later adopters of new communication technologies?

4. To what extent do the new communication technologies widen (or close) gaps between the information-rich and the information-poor in an information society?

THE INNOVATION-DECISION PROCESS IN HOME COMPUTER ADOPTION

The innovation-decision process is that through which individuals or groups of individuals pass from knowledge of an innovation through the decision to adopt or to reject the innovation. The innovation-decision process is comprised of five stages: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation (Rogers, 1982). The knowledge stage occurs when the individual learns of an innovation and has some idea of how it functions. The persuasion stage occurs when mass media and interpersonal channels influence the individual to form a favorable or unfavorable attitude toward the innovation. The decision stage marks a mental commitment by the individual to adopt or reject an innovation. Implementation involves putting the innovation into use. Last, confirmation occurs when the individual decides whether to maintain the adoption/rejection decision he has made with respect to the innovation, or to change his mind.

In the case of home computers, for the purpose of this analysis, we distinguish between two types of decisions that a person makes in the innovation-decision process. The first, the *adoption decision*, includes the individual's decision to purchase a home computer at some time, regardless of any particular brand. The second, the *brand choice*, occurs when the adopter decides what brand to purchase. The choice of brand is a substage of implementation.

Stages in the Innovation-Decision Process

Awareness-Knowledge Stage

We asked our 77 user respondents where they first heard about home computers. Nine categories emerged from their responses. Two are primarily mass media, namely, general media and computer-electronic magazines. The others are interpersonal. The respondents tended to rely mostly on a variety of interpersonal channels at the awareness-knowledge stage in the innovation-decision process.

As Table 2 shows, interpersonal channels (54.6 percent) were mentioned more often than mass media (39.4 percent). Therefore, at the awareness-knowledge stage

in the innovation-decision process in home computer adoption, interpersonal channels are relatively important, at least in the eyes of our owner-respondents. If interpersonal channels do indeed have a greater effect at this stage than mass media, this would contrast with the majority of other innovations that have been studied; mass media are usually the most important sources/channels of awareness-knowledge.

TABLE 2. WHERE RESPONDENTS FIRST HEARD ABOUT HOME COMPUTERS.

Source/Channel	Percent of Responses	
MASS MEDIA SOURCES		(39.4%)
1. General media	21.2	
2. Computer/electronic magazines	18.2	
INTERPERSONAL CHANNELS		(54.6%)
1. Work colleagues	19.7	
2. Schools and teachers	13.6	
3. Friends	7.6	
4. Store representative	7.6	
5. Family members	6.1	
OTHER	6.0	
Total	100.0	

Computer and electronic magazines account for awareness of home computers for a large proportion of our sample, nearly one-fifth.

Very early adopters of home computers depended disproportionately more upon computer-electronic magazines; 42 percent of the earliest adopters (those buying before 1979) first found out about home computers from technical magazines.

Among interpersonal channels, work colleagues provided an awareness of home computers for a large fraction of the sample, as did schools and teachers. Friends, on the other hand, provided awareness-knowledge for only a few computer owners.

Decision Stage

At the decision stage—the stage in the process when a person makes the decision to purchase a home computer—interpersonal channels are mentioned more often that

the mass media sources, as Table 3 shows.

TABLE 3. INFLUENTIAL SOURCES/CHANNELS IN THE DECISION STAGE AND THE BRAND CHOICE.

Source/Channel	Decision Stage		Brand Choice	
	Percent of Responses	Percent of Cases	Percent of Responses	Percent of Cases
MASS MEDIA				
1. Hobby magazine:				
a. Articles	9.7	27.0	10.9	25.7
b. Advertisements	6.3	17.6	4.6	10.8
2. Newspaper:				
a. Articles	8.3	23.0	6.3	14.9
b. Advertisements	4.4	12.2	3.4	8.1
3. Popular magazine:				
a. Articles	6.3	17.6	5.7	13.5
b. Advertisements	2.9	8.1	2.3	5.4
4. Television:				
a. Shows	1.0	2.7	0.0	0.0
b. Advertisements	1.0	2.7	1.1	2.7
INTERPERSONAL				
1. Friend	16.5	45.9	18.4	43.2
2. Work associate	13.1	36.5	12.1	28.4
3. Computer store	10.2	28.4	16.1	37.8
4. Work place	7.8	21.6	7.5	17.6
5. Relative	2.9	8.1	2.3	5.4
OTHER	9.7	27.0	9.2	21.6
Totals	100.0	278.4*	100.0	235.1†

*Each respondent could cite more than one factor that influenced their decision to adopt.
†Each respondent could cite more than one factor that influenced their choice of a brand.

Of the mass media sources, hobby magazines have the largest influence, followed closely by newspapers and popular magazines. Apparently, television had only a

minor impact on the home computer owners' decision to adopt.* As in the previous stage, that of awareness-knowledge, technical or computer hobby magazines have a relatively important role in the innovation-decision process.

Moreover, mass media channels exert more of their influence through their articles than their advertisements; respondents mentioned articles about twice as often as advertisements as influencing their decision to adopt. This ratio holds very nearly constant across the four mass media sources that we tested. Thus, no one mass media source seemed to be especially effective than the others as a carrier of article or advertisement material.

Nevertheless, the three most cited sources are interpersonal: friends, work associates, and computer stores. These three sources alone accounted for almost 40 percent of the responses. If the frequency of respondents' answers to our question is a reflection of the relative importance of the sources and channels, then interpersonal channels have much influence at both the awareness-knowledge stage and the decision stage of the innovation-decision process.

On the average, our respondents reported 2.8 influences at the decision stage. However, owners who mentioned using only one type of information source at the decision stage—that is, either all mass media or all interpersonal—comprised a large proportion of our sample: 55 percent. An examination of these users of a single source/channel type shows that 67 percent mentioned only interpersonal sources or channels, while the remaining 33 percent mentioned only mass media sources. Thus, at the decision stage, the large fraction of those who rely on a single type of information are more likely to use interpersonal channels.

Last, we note an apparent relationship between the use of one mass medium and the use of other mass media as sources/channels at the decision stage. Individuals who used the mass media as sources, generally cited several of our mass media categories as sources.

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*We note, however, that television may have an indirect effect on the knowledge, persuasion, and decision stages, by altering our notions and our attitudes concerning computers and technology (Rogers and Kincaid, 1981). The portrayal of computers and high technology on television shows, commercials, and news broadcasts has become commonplace. The resulting effect on adoption behavior, however, is not clear.

Taken together, these last two findings would seem to suggest that interpersonal channels are used more extensively by those who had only a few sources, while mass media are used more by those who used several sources/channels.

Implementation Stage

Brand Selection

Interpersonal channels are more frequently mentioned than mass media at the implementation stage, i.e., the choice of a brand of home computer. Computer owners were asked to list the sources/channels of information which had affected their decision to purchase their particular brand of home computer. Their responses are displayed next to those for the decision stage (Table 3).

Again, among mass media sources, respondents cite articles about twice as often as they do advertisements. Hobby magazines are most often mentioned as affecting one's brand choice, with newspapers and popular magazines less influential. Television is mentioned only rarely. Thus, these results are almost identical to those at the decision stage, with the only major difference being a decline in the influence of newspaper articles and advertisements, in both absolute responses and responses relative to other responses.

The three major interpersonal channels cited in the choice of brand are the same as those identified previously at the decision stage. Friends, as before, are most influential. Nearly half of the adopters cite their friends as sources of information that influenced their choices of a home computer brand. At this stage, however, computer stores are mentioned more often than work associates in the brand choice.

The sources and channels at the decision stage are generally similar to those for choosing a brand of home computer. Adopters generally cited the same sources/channels at both the adoption-decision and the brand-choice stages. A high correlation between the influences cited by adopters at these two stages shows that, for any given adopter, a similar set of sources/channels were cited at both the adoption-decision and the brand-decision.

Trigger Events

A *trigger event* is an event that precipitates an adopter's purchase. An individual who has already decided to adopt an innovation may be motivated by a trigger event to actually proceed with adoption.

Trigger events appear to have special importance in our sample of home computer owners. Although we lack information concerning the role of trigger events in other diffusion processes for comparison, the effect of trigger events in our sample of home computer adopters seems rather pronounced. As Table 4 indicates, more than half (54 percent) said that some event triggered their decision to purchase a home computer.

TABLE 4. TRIGGER EVENTS IN THE ADOPTION OF HOME COMPUTERS CITED BY OUR RESPONDENTS.

Trigger Event	Percent of Total Sample	Percent of Those With Trigger Events
1. Obtained enough money	10.4	19.1
2. Job-related	10.4	19.1
3. Special deal	9.1	16.7
4. Gift	9.1	16.7
5. Major project or thesis	3.9	7.2
6. Other	11.6	21.3
No trigger event	45.5	—
Totals	100.0	100.0

Many of the trigger events (38 percent) relate to the cost of the computer, such as obtaining enough money or getting a special purchase deal. It appears in these cases that the decision to purchase is made in advance, and the trigger event allows the adopter's decision to be implemented. Owners who cited trigger events usually had other reasons for purchasing a home computer, citing different rationales as their primary reasons for adoption. In other words, trigger events indicate a change in an individual's *ability* to purchase, rather than his *intent* to purchase. Thus, a trigger event appears to enable the individual to implement a previous decision to adopt, placing it at the implementation stage.

At least some of the trigger events, however, such as those dealing with job-related needs, appear to be primary motivations for adoption. Thus, trigger events may apparently influence the decision stage as well.

The prominence of trigger events in the innovation-decision process could suggest that the decision to buy the product may be somewhat whimsical. However, in the case of home computer adoption, it more probably indicates that the actual purchase carries a high motivational threshold, a barrier to implementation. These are manifested in the many considerations to adoption that our respondents cited. Apparently, the advantages and disadvantages of home computers do not presently offer a clear-cut decision to many potential adopters. The significance of trigger events and the barriers to implementation in the diffusion of home computers may partially account for their low rate of adoption. As social learning theory explains:

> Innovations spread at different rates and patterns because they have different requirements for adoption. These serve as additional factors controlling the diffusion process. People will not adopt innovations even though they are favorably disposed toward them if they lack the money, the skills, or the accessory resources that may be needed. (Bandura, 1977).

Confirmation Stage

One measure of the home computer owners' views of the product is their degree of satisfaction. We asked the 79 adopters how satisfied they were with their home computer. Table 5 shows that the majority of computer users are satisfied with their home computers.

TABLE 5. DEGREE OF SATISFACTION WITH HOME COMPUTER.

	Degree of Satisfaction	Percent
Very dissatisfied	1	1.3
	2	1.3
	3	6.5
	4	5.2
	5	16.9
	6	29.9
Very satisfied	7	39.0
Total		100.0

The highest degree of satisfaction on our scale (7) represents the largest response, followed in order by the adjoining response categories. More than two-thirds of the

owners cited the top two levels of satisfaction. The lowest degree of satisfaction received only a small fraction of the total responses.

A further analysis using regression showed that two factors best predict satisfaction: (1) the amount of experience the adopter had with a computer before he purchased one, and (2) the degree to which the home computer was used for entertainment. The satisfaction of the owner in the confirmation stage is therefore correlated with his characteristics and actions in other stages of the innovation-decision process.

Comparisons across Stages in the Innovation-Decision Process

Sources and channels change slightly across the stages in the innovation-decision process for home computers. A summary of the influence of mass media and interpersonal channels during the innovation-decision process is shown in Table 6.

TABLE 6. RELATIVE INFLUENCE OF MASS MEDIA AND INTERPERSONAL CHANNELS DURING THE INNOVATION-DECISION PROCESS.

	Percent of Responses		
	Awareness Stage	Decision Stage	Brand Choice
Mass Media Sources	39.4	39.9	34.3
Interpersonal Channels	54.6	50.5	56.5

In general, the mass media appear to have a greater role earlier in the innovation-decision process, while the relative influence of interpersonal channels has the most influence in the implementation stage. It is difficult to carry out a truly direct comparison between the awareness-knowledge stage and the other two stages, though, since our questionnaire allowed only one response for the first stage—corresponding to the first source of awareness-knowledge—while the other two questions allowed multiple responses.

Nevertheless, the influence of some of the sources and channels changes quite significantly during the innovation-decision process. The influence of friends have quite a dramatic change over time; they are only minor sources of awareness-knowledge (8.9 percent of the respondents), but are the most important influences in the decision stage (45.9 percent) and in the brand choice (43.2 percent). Other interpersonal

sources also have a more prominent role after the initial awareness stage. For instance, work associates account for awareness of home computers for 19.7 percent of the owners, while they affected the decision stage for 36.5 percent and the choice of brand for 28.4 percent. Similar trends hold for computer stores, which rise in importance from 7.6 percent of the respondents' initial awareness to 28.4 percent of the respondents in the decision stage, and 37.8 percent in the choice of brand.

We have noted the overall trends in influence among our sample, but what differences across the stages do individual owners show? To better determine the consistency of the types of influence across stages, we classified the home computer owners as either "mass media" or "interpersonal," based on the source of their initial awareness-knowledge of home computers. Their subsequent sources of information are shown in Table 7 for the decision stage, and Table 8 for the brand choice.

The data show that mass media is used by the "mass media" owners (home computer owners who learned initially about home computers from a mass media channel) much more than by those who learn about home computers from interpersonal channels. Likewise, home computer owners who gain first awareness-knowledge from an interpersonal source rely on interpersonal channels more than the other group.

The differences are fairly consistent for the decision stage and the brand choice. For instance, of those home computer owners who became initially aware of home computers via interpersonal channels, 43.5 percent rely on friends in the decision stage and 41.3 percent rely on friends when choosing a brand; for those who became aware of home computers via mass media channels, 28.6 percent rely on friends in the decision stage and 18.3 percent when choosing a brand. Similarly, hobby magazine articles were more important for owners who learned about home computers from mass media channels (38.1 percent in the decision stage, 27.3 percent in the choice of brand) than those who learned about home computers from interpersonal channels (21.0 percent in the decision stage, 20.6 percent in the choice of brand).

It is not clear whether this phenomenon is due to the accessibility of various types of sources/channels of information to the individual, or to the differences in the type and extent of informational content of different sources/channels. However, most communication research emphasizes the importance of channel accessibility, source expertise, and source trustworthiness as the factors which determine an individual's sources/channels of information (Chaffee, 1981).

TABLE 7. THE SOURCES/CHANNELS OF INFLUENCE AT THE DECISION STAGE BASED ON INITIAL SOURCE OF AWARENESS-KNOWLEDGE.

Source/Channel	Initial source of awareness: Mass Media — Percent of Responses	Mass Media — Percent of Cases	Interpersonal — Percent of Responses	Interpersonal — Percent of Cases
MASS MEDIA				
1. Hobby magazine:				
a. Articles	13.6	38.1	8.1	21.0
b. Advertisements	8.5	23.8	5.0	12.9
2. Newspaper:				
a. Articles	10.2	28.6	7.5	19.2
b. Advertisements	6.8	19.0	3.7	9.7
3. Popular magazine:				
a. Articles	6.8	19.0	5.0	12.9
b. Advertisements	5.1	14.3	2.5	6.5
4. Television:				
a. Shows	1.7	4.8	1.2	3.2
b. Advertisements	0.0	0.0	1.2	3.2
INTERPERSONAL				
1. Friend	10.2	28.6	16.8	43.5
2. Work associate	8.5	23.8	14.9	38.7
3. Computer store	8.5	23.8	10.6	27.4
4. Work place	6.8	19.0	8.7	22.6
5. Relative	3.4	9.5	2.5	6.5
Totals	90.1	252.3	87.7	208.4

TABLE 8. THE SOURCES/CHANNELS OF INFLUENCE IN THE BRAND CHOICE BASED ON INITIAL SOURCE OF AWARENESS-KNOWLEDGE.

Source/Channel	Initial source of awareness: Mass Media — Percent of Responses	Mass Media — Percent of Cases	Interpersonal — Percent of Responses	Interpersonal — Percent of Cases
MASS MEDIA				
1. Hobby magazine:				
a. Articles	11.8	27.3	19.0	20.6
b. Advertisements	3.9	9.1	3.5	7.9
2. Newspaper:				
a. Articles	13.7	31.8	6.9	15.9
b. Advertisements	5.9	13.6	3.5	7.9
3. Popular magazine:				
a. Articles	5.9	13.6	6.3	14.3
b. Advertisements	5.9	13.6	2.8	6.3
4. Television:				
a. Shows	0.0	0.0	0.0	0.0
b. Advertisements	2.0	4.5	1.4	3.2
INTERPERSONAL				
1. Friend	7.8	18.2	18.1	41.3
2. Work associate	9.8	22.7	12.5	28.6
3. Computer store	17.6	40.9	15.3	34.9
4. Work place	3.9	9.1	8.3	19.0
5. Relative	0.0	0.0	2.1	4.8
Totals	88.2	204.4	99.7	204.7

ATTRIBUTES OF HOME COMPUTERS AND THEIR DIFFUSION

The perceived attributes of innovations are major determinants of the pattern of diffusion and the rate of adoption. Interpersonal and mass media sources/channels of information and influence alone do not fully explain innovation-decisions. Indeed, the fact that home computer adoption has a major hardware or "object component" suggests that certain innovation attributes have an important role in explaining the adoption of home computers.

Five Attributes of Innovations

Rogers with Shoemaker (1971) suggested five attributes of innovations: (1) relative advantage, (2) compatibility, (3) complexity, (4) observability, and (5) triability. The first four are important primarily in the early stages of the innovation-decision process. They determine the amount of attention an innovation will receive from members of a social system, the functioning of selective attention and perception in the individual evaluation of an innovation, and the level of incentive or disincentive for adoption. Triability is most relevant at the implementation stage of the innovation-decision process.

Here we briefly discuss the salient attributes of home computers, cite relevant information obtained from the home computer survey, and propose hypotheses regarding the relationship of specific attributes to the rate of adoption of home computers.

Relative Advantage

Relative advantage is the degree to which an innovation is perceived as better that the idea it supercedes (Rogers with Shoemaker, 1971). It is often expressed in terms of economic profitability. However, a number of other factors are properly considered under the rubric of relative advantage because they are important elements of the home computer's functional value.

Our 77 home computer owners were asked a number of questions about their perceptions of home computers prior to making a purchase. They were asked about the advantages they saw, as well as negative considerations. They were also asked the price they paid for their home computer, the time it took them to become comfortable

in using it, and the amount of time that the home computer was used per week for various functions.

Before we turn to the responses to these questions we might consider: "What are the alternatives to owning a home computer?" In other words, "What are the current technological options against which the functional value of a home computer must be weighed?" The home computer has been suggested as a reasonable alternative or at least a partial substitute for several technologies/behaviors. First, the technologies: the typewriter, the telephone, and television. Second, the behaviors: working in an office environment, using the mail, watching television, and playing board or card games.

First, we asked respondents, "While you were deciding whether or not to buy a home computer, what did you think were the main advantages of owning one?" Most respondents cited at least two advantages. As shown in Table 9, comments associated with work or business advantages accounted for the largest percent (22 percent) of the first responses given; about a third of the respondents mentioned advantages which fell into this category. Another 30 percent mentioned hobby and entertainment ("fun" and "games") advantages, and 20 percent reported personal or child learning benefits. Other advantages mentioned fell into the categories of "personal accounts," "word processing," "personal programming," "saves money," and "saves time."

TABLE 9. ADVANTAGES OF THE HOME COMPUTER AS PERCEIVED BEFORE PURCHASE.

Advantages	Frequency	Percent
1. Work-business	22	17.2
2. Personal accounts	16	12.5
3. Education	17	13.3
4. Word processing	13	10.2
5. Hobby/fun/games	22	17.2
6. Save time	3	2.3
7. Personal programming	6	4.7
8. Save money	5	3.9
9. Other	24	18.8
Totals	128*	100.0

*Our 77 respondents to this question could each name more than one advantage of home computers.

We also asked respondents for their single most important reason for buying a

home computer (Table 10).

The most frequently mentioned reasons were: "to work at home," "word processing," "as part of my job," and "fun and games," in that order. Dominant were three types of responses which were all directly work-related (but not necessarily employment-related): "business/make money," "work at home," and "part of job." Combined, these account for almost 40 percent of the responses. The second most important cluster (accounting for about 20 percent of the responses) is education-related: "computer-related learning," "self-education," and "child-education." The entertainment function (9 percent) is notably low in prominence when compared to these response clusters.

TABLE 10. MAIN REASON FOR PURCHASING A HOME COMPUTER.

Main Reason	Frequency	Percent
1. Work at home	14	18.9
2. Word processing	9	12.2
3. Part of job	8	10.8
4. Fun and games	7	9.5
5. Business/Make money	6	8.1
6. Self-education	6	8.1
7. Child-education	5	6.8
8. Computer-related learning	4	5.4
9. Bought as good deal	4	5.4
10. Link to computers	2	2.7
11. Other	8	10.8
12. None	1	1.4
Total	74*	100.0

*Three of our 77 respondents did not answer this question

Many respondents did not need much to convince them of the advantages of a home computer. Asked, "When you first heard of home computers, were you immediately interested in owning one?", 53 percent of the respondents said "Yes."

We also asked about negative considerations prior to purchase (Table 11). By far the most prominent negative aspect of owning a home computer was the cost of purchase. About two-thirds of the home computer owners mentioned this aspect. Fear of anticipated difficulties in learning to use and program the computer was the next most mentioned (19 percent). About a third of the respondents offered comments which reflected a variety of pre-decision concerns about the limitations

of the home computer: "fear of obsolescence," "limited capabilities," and "problems with software."

TABLE 11. NEGATIVE ASPECTS OF THE HOME COMPUTER AS PERCEIVED BEFORE PURCHASE.

Negative Aspects	Frequency	Percent of Responses
1. Cost	47	46.1
2. Hard to use/language	13	12.7
3. Fear of obsolescence	6	5.9
4. Limited capability	9	8.8
5. Problems with software	9	8.8
6. Poor memory	2	2.0
7. Space	3	2.9
8. Other	6	5.9
9. None	7	6.9
Total	102*	100.0

*Respondents could each name more than one negative aspect of home computers.

As we noted previously in this report, brand selection may be considered a sub-stage of implementation in the adoption of a home computer. A number of attribute considerations which affect purchase and use should become prominent at this point. The attributes most frequently taken into account in the brand selection process were "cost" and "software." These factors were mentioned by more than 50 percent of the respondents. The factors of "programmability," "expandability" (using peripherals), and the "size and reputation" of the manufacturer were mentioned by more than 30 percent of the respondents. The two most prominent factors—cost and software—lie on opposite sides of relative advantage considerations: "cost" represents the economic loss consideration involved in the adoption decision; "software," the potential functional gains.

The cost of a home computer appears to be the major negative consideration for most computer owners. The average total expenditure on a home computer (including the cost of peripherals) was around $3,000. Most owners spent from $1,000 to $5,000. The lowest reported total investment was $500, and four persons reported expenditures of less than $1,000. The highest expenditure was $11,000.

Another important negative consideration was the anticipated difficulties associated with learning to use and program a home computer. On the average, it

took about one month for owners to learn to use their new purchase. Some were familiar with the home computer prior to purchase, and a large group (39 percent of our respondents) reported being comfortable using their new home computer within a week after purchase.

What are the implications of these data for the evaluation of the relative advantage of the home computer in the consumer market? They inform discussion in three ways: (1) the nature of the costs, (2) the modes of consumer evaluation, and (3) the domains of comparison.

First, costs are large and varied. In spite of their above-average incomes, most of our respondents regarded their purchase as a major financial investment. The financial cost is not just a hindrance, but a potential barrier to adoption: "cost," said one respondent, "was the *only* preventive factor." Along with the dollar costs, the cost of learning is prominent in the minds of potential adopters. Respondents considered the cost of learning both in terms of "the amount of *time* to learn the system," and the *effort* required, "dealing with the frustrations of programming."

Second, evaluation of the home computer is generally based on considered cost-benefit or cost-utility criteria. The home computer, at least at this stage, is not an impulse purchase. Most owners purchased their home computers with business, work, or career-related advantages in mind (even though they may later use it for other purposes). For example, those who stated "word processing" as their main motivation to purchase a home computer, usually used it to write books, articles, memoranda, etc. They "word process" for profit. Those who did not give a financial justification for their purchase seriously considered the extent to which they would be able to use it. Said one respondent: "Wasn't sure I'd use it enough to justify the expense." The question of utility allows families greater justification for purchase than single individuals, particularly in view of the multi-function attribute of home computers—an element which facilitates use by several family members.

Third, our data allow us to note some of the lines along which comparisons are being made by potential home computer adopters. Many responses to our questions regarding perceived attributes were *goal-oriented* rather than *attribute/function oriented*. A person who sees the home computer as a means of "saving time" may be comparing it with a typewriter, a drawing board, or commuting to work. The majority of responses were, however, fairly specific. They allow us to draw up a

list of discrete comparisons which are often being made in home computer adoption-decisions:

1. Word processing on a home computer *versus* typing at a typewriter

2. Computing at home *versus* computing at the office

3. Home computer games *versus* other forms of home entertainment

It is instructive to note some of the pros and cons on both sides of the comparisons, and the resulting implications as to the kind of potential adopter who might make a decision on the basis of such comparisons.

With respect to the first comparison, on the side of the typewriter is immediate cost. A home computer with moderate word processing capabilities, along with a printer, today costs around $3,000, considerably more than a good typewriter. Word processing requires an incrementally greater initial effort to learn. There are, however, a number of long-term potential savings: savings in terms of a reduced need for secretarial help, greater ease and flexibility in editing and rewriting documents, and approximately a 35 percent increase in productivity.

The high cost of home computers (with medium-level capabilities for word processing) suggests that only those for whom writing is a major part of their livelihood (writers, teachers, researchers, business professionals, and students) would find a home computer superior.

The alternative of "working at home" *versus* "working at an office" is not as clear-cut as it may sound. Those respondents who mentioned "working at home" as a motivation for purchase of a home computer also spent time at an office. Thus, for most, the issue is one of the relative advantages of carrying out a portion of one's work responsibilities at home. On the side of the option to work at home are: (1) independence from the institutional environment and its constraints, (2) reduced transportation costs, and (3) more time in the company of family members. Against the work-at-home alternative are: (1) the work pressures brought into the home environment; (2) the danger of "workaholism;" (3) possible reduction in productivity due to household distractions; and (4) the dollar costs incurred (for purchase, maintenance, and improvements) which may not be reimbursed or recognized by the employing institution.

The subset of consumers who might make this comparison is potentially inclusive of the previous group, but it also includes anyone who uses or could use a computer to do his work—e.g., programmers, data-processors, engineers, architects, accountants, and typists. Doing work at home rather than in the office is not, however, an option open to all. The relative advantage (or disadvantage) of working at home is thus an issue of comparison only for those professionals who are free to control their own work pace and output.

As for the third comparison, the largest obstacle to the home computer is the present saturation of the U.S. market with tried and proven home entertainment fare. Passive enjoyment of dramatic, humor, and music programming on television or radio, records or videodiscs, videotape or home movies, etc., may have more appeal than the interactive requirements of computer games. The interactive element of computer games, however, seems to provide the greatest attraction for youth (Paisley and Chen, 1982). The explosion of the arcade video game market provides striking evidence of this. Consumer market competition in the home entertainment field suggest that the home computer must meet at least two requirements to be competitive: (1) it must be priced at comparable levels to other home electronics such as TV's, stereo components, VCR's, and home movie equipment, and (2) it must guarantee continuing satisfaction. The first requirement has been substantially addressed within recent months through the marketing of bottom-of-the-line home computers with many computer-game options for under $200. Continuing consumer doubt with respect to the second requirement is reflected in our respondents' concern over "software availability."

Potentially all middle- and upper-income consumers in the U.S. *could* consider purchase of a home computer solely on the basis of its entertainment function. The number who *do* will be a function of the growth of knowledge about home computers over time.

On balance, our discussion of perceived advantages and their implications has weighed in favor of the home computer. We believe that on the dimension of relative advantage, the home computer is perceived positively by a large majority of households as knowledge about the functions and capabilities of home computers becomes more widespread.

The dimension of relative advantage is, however, but one of the five attributes

affect the rate of adoption.

Compatibility

Compatibility is the degree of perceived consistency between the innovation and the past experiences, existing values, and needs of the individual. In regard to home computers, we consider two dimensions of compatibility:

1. The socio-psychological aspect—Is the home computer perceived as fitting into the potential adopter's view of him/herself and his/her lifestyle?

2. The functional aspect—Are the operations of the home computer such that the potential adopter will be *able* to make full use of it?

The rise of "technophobia" as a social issue is testimony to the the fact that not everyone is comfortable with computers. Indeed, while most Americans will have had some mediated experience with computer technology via the popular press, television, movies, etc., a relatively small proportion of the U.S. population has direct experience with computers. Individuals with such experience are college students, scientists, engineers, and technical workers in high-technology fields.

Our evidence for the role of perceived compatibility in home computer adoption is very indirect. It is tentatively inferred from the relative earliness (or lateness) of adoption by individuals with backgrounds suggestive of high compatibility. A 1978 study indicated that home computer owners and prospective buyers generally came from high-technology occupations; 50 percent of the respondents were in engineering or computer science (Holmen, 1979). A later survey by ARBOR Inc. (1981) found that about 36 percent of home computer owners were in technical/scientific fields. A growing number of home computer owners belong to what might be describe as the "business community."

In the present study 30 percent of the 77 home computer owners were scientists, engineers, or technicians. *Within* our sample those who were relatively earlier in purchasing their home computer were for the most part scientists and engineers, professors in the sciences, technical professionals, and science and engineering students. These owners represented about 80 percent of those who purchased home computers prior to January, 1980.

One question asked in our survey provided some further insight into the importance of the psycho-sociological aspect of compatibility. We asked home computer owners "While you were deciding whether or not to buy (a home computer), did you consider how a home computer would affect your lifestyle?" Seventy-five percent of our respondents said no, they did not. In contrast about 70 percent of the non-adopters thought that owning a home computer would affect their lifestyles.

To fully utilize the type of home computers currently on the market, the user must possess (or acquire) a number of skills. Cognitive skills such as disciplined typing, and logical skills such as those involved in manipulating packaged programs or creating simple directional programs, are prerequisites for many home computer uses. To test the importance of functional compatibility we created a categorical variable of "expertise" based on the respondent's occupation, the programming languages known, and the use of a computer at the place of work. If the respondent fell into the category of "expert," it would be reasonable to expect that he/she had a reasonable level of computer expertise *prior* to the time of purchase. Crosstabulations using this variable showed that the "experts" were more likely to adopt earlier.

Recent concern in the computer industry with "user-friendly" software reflects a growing recognition of the importance of compatibility in home computer adoption. The movement toward natural language programming, the development of voice synthesizers, the light-pen, and "mouse" technology all contribute to bridging this compatibility gap. The integration of the home computer into pre-packaged home entertainment systems (a marketing approach which has been given some attention by researchers at the Institute for the Future) may increase perceived compatibility of home computers by the mass consumer market.

The increasing presence of computers in the work and school environment suggests that, even as the home computer is being adapted to fit the world of the average person, the mental world of that person is changing to accommodate the computer.

Complexity

Complexity is the degree to which an innovation is perceived as difficult to understand or to use. The complexity of an innovation is negatively related to the rate of its adoption within a social system. As a factor in home computer adoption,

complexity is relevant both at the level of concept and the level of use.

The first issue is the degree to which the innovation, as a concept, involves complex ideas. One indicator is the range of perceived advantages offered by the innovation; another is the range of uses reported. Our data indicate that the home computer is usually perceived as offering a multiplicity of functions. As noted elsewhere, home computer owners generally mentioned two or three main advantages of owning a home computer, which they considered prior to purchase. These range from "games" to "making money" to "good for the children." A third of our 77 respondents, however, mentioned only one advantage. Interestingly, the "single advantage" responses did not load on one or two attributes or functions (such as "games" or "word processing"), but rather were distributed across several.

As to the variety of uses, most respondents reported using their home computers regularly for from four to six different purposes. A minimum of 25 percent reported weekly use time for each of nine separate categories of home computer use (a detailed report on this usage is found later in this report). Usage is not strictly an appropriate measure of perceived complexity, since current use may be more varied than that anticipated (60 percent of our 77 home computer owners said that they had not discovered any uses for their computer that they had not thought of prior to purchase).

We believe that the degree to which the "home computer idea" requires the simultaneous appreciation of a multiplicity of functions is a measure of its complexity. The findings are thus double-barrelled in their implications: while most potential adopters take note of several functions, for many, single functions appear to be compelling.

Zaltman and others (1973) suggest that "an innovation which is easy to use but whose essential idea is complex, is more likely to be adopted than an innovation which is difficult to use but whose essential idea of concept is readily understood." In the case of the home computer, complexity at the *level of use* may be understood to encompass the practicalities of purchase, installation, operation, and maintenance. We asked home computer owners a number of questions about place of purchase, peripheral devices purchased, and problems encountered during first use.

We asked home computer owners, "Where did you purchase your home computer?" Table 12 shows that over 46 percent purchased their home computer from

a computer store. Other major major places of purchase were "the manufacturer's store" and "direct mail."

TABLE 12. PLACES WHERE RESPONDENTS PURCHASED THEIR HOME COMPUTERS.

	Number	Percent
1. Computer store	36	46.8
2. Manufacturer's store	12	15.6
3. Direct mail	8	10.4
4. Electronics store	6	7.8
5. Another individual	5	6.5
6. Computer fair	1	1.3
7. Department store	1	1.3
8. Other	8	10.4
Total	77	100.0

The emergence of the "computer store" has simplified substantially the process of buying a home computer. The retailing of home computers in department stores could also possibly go a long way toward reducing "compatibility" barriers.

One measure of the complexity associated with installation of a home computer is the number of separate "pieces" that must be bought and put together for the home computer to work. Apart from the fact that the basic "nucleus system" of the home computer is often composed two or three separate components—the CPU, a screen monitor, and a keyboard—there are several peripheral devices that must also be purchased to make full use of certain functions. A printer, for example, supports word-processing use; separate disc drives are often necessary to expand the memory capacity and the speed of operations; and a modem (which can cost as much as the computer itself) must be purchased to access external databases or to link with a mainframe computer.

On average our respondents owned two peripherals in addition to the nucleus system. Most respondents bought one or two peripherals at the time of their initial purchase of their home computer. One respondent who owns three home computers remarked, "They've got to do something about all these cables and plugs—it must be really confusing to the average person." The average consumer who has problems putting a component stereo system together will not have less trouble with a home computer. On the other hand he/she will not necessarily have much more. An important difference, however, is that there is a wide array of other complexities

associated with the home computer. The development and marketing of the home computer as a "plug in and use" device will contribute to reducing the perceived complexity of the innovation.

An indicator of the perceived complexity associated with operation and maintenance is the number and types of problems reported by home computer owners. We asked our home computer owners: "Did you encounter any problems using you home computer?" More than 60 percent said "Yes." Table 13 displays the main categories of problems reported.

TABLE 13. PROBLEMS REPORTED BY HOME COMPUTER OWNERS AFTER PURCHASE.

Problems	Frequency	Percent of Responses
I. Problems reported as severe		
1. Bad documentation	13	31.0
2. Breakdowns	11	26.2
3. Lack of useful programs	7	16.7
4. Difficulties learning to use system	6	14.3
5. Problems in programs	5	11.9
Totals	42*	100.0
II. Problems reported as minor		
1. Difficulties learning to use system	11	34.4
2. Breakdowns	8	25.0
3. Problems in programs	7	21.9
4. Bad documentation	5	15.6
5. Lack of useful programs	1	3.1
Totals	32†	100.0

*These 42 responses were given by 27 of our 77 respondents.
†These 32 responses were given by 24 of our 77 respondents.

The problems most frequently reported as severe are "bad documentation" and "breakdowns." The problems most frequently reported as minor are "difficulties learning to use the system." Combining reports of severe and minor problems, over 40 percent of home computer owners reported difficulties in learning how to use their home computer, breakdowns, and bad documentation. Among other problems reported were unspecified "hardware problems," "interfacing problems," and "breaking joysticks."

Our description of complexity problems associated with the home computer does

not demonstrate its impact on the rate of adoption, which can only be inferred. We have dwelt on complexity because it is not only relevant as an attentional and motivational factor in the decision process in home computer adoption, but may be the central determinant of practice. About 25 percent of both our home computer owner and non-adopter respondents agreed that "computers are too complicated for most people to ever understand."

Observability

Observability is the degree to which the results of an innovation are visible to others. The benefits of a new mode of transportation, for example, would be more observable than a new contraceptive technique. The observability of an innovation contributes positively to its rate of adoption.

As innovations go, the home computer starts off with high marks for observability: it is a physically demonstrable object, rather than simply an idea. Many of the home computer's new-found functions, such as games, news-retrieval, and word processing, are much more communicable than were traditional computational functions. "Space Invaders" adds more to the home computer's observability than double-precision arithmetic. The trend in office automation away from "Management Information Systems" to the "individual work-station" concept also adds to the observability of microcomputers.

We asked our respondents about the positive and negative results of owning a home computer, which had been conveyed to them by other home computer owners. Twice as many positive results are mentioned as are negative. This ratio also held in the non-adopter group. The entertainment function is prominent.

Another tentative index of the observability of the home computer is the ratio between (1) the percent of our respondents who knew a home computer owner, and (2) the percent who report that the owners' evaluation of the home computer was conveyed to them. Among our 77 home computer owners, 74 percent knew at least one other home computer owner before they they made their purchase, while 68 percent reported receiving the owners' evaluation of the home computer, a ratio of .91. Ninety-five percent of our 19 non-adopters knew at least one home computer owner and most knew three or four. Eighty-four percent reported that an evaluation

was conveyed, a ratio of .88.

We also asked our 77 home computer owners: "Where in the house do you keep your home computer?" To avoid the particular bias introduced by the nature of campus student accommodations we exclude students from the data shown in Table 14. Two low-visibility spots—the study and the bedroom—were the most frequently used locations.

As might be expected, those who reported keeping their home computer in the family room, living room or den (about 30 percent of the respondents) were more likely to report a high percentage use for entertainment purposes.

TABLE 14. WHERE THE HOME COMPUTER IS KEPT IN THE HOME.

Location	Number	Percent
1. Study	17	29.3
2. Bedroom	12	20.7
3. Other	9	15.5
4. Family room	7	12.1
5. Living room	6	10.3
6. Den	5	8.6
7. Kitchen, dining room	2	3.4
Totals	58	100.0

The issue of observability in the home is perhaps overshadowed by the high visibility of computer terminal and display devices in the public domain—in libraries, bookstore, airports, supermarket check-out counters, etc.

Triability

Triability is defined as the degree to which an innovation may be experimented with on a limited basis. Zaltman and others (1973) emphasize the negative side of the triability dimension: "the degree to which and the ease with which the *status quo ante* can be reinstated."

In the case of the home computer, it is useful to consider two aspects of triability: (1) accessibility for trial, and (2) divisibility for trial.

Accessibility is how easy it is for the potential buyer to try out a home computer

prior to his purchase. We asked our 77 home computer owners, "Did you get a chance to use a home computer before you bought one?" One-third of our respondents said "No." Of those who said "Yes," 37 percent tried a home computer at their work place, 37 percent at a friend's home, and 43 percent at a computer store. Another 32 percent mentioned a variety of other contexts: computer fairs, colleges, or computer "practice stores"—in which, for a fee, anyone may try out a range of home computers. About one-fourth of our respondents got some prior experience with the home computer in two or three different contexts.

There is a moderate association between the number of different trial opportunities and the year of home computer purchase. While 21 percent of the respondents who purchased their home computers after January 1981 reported trial opportunities in three different contexts, no respondent in the period from 1975 to 1980 reported more than two. Indeed, for each of the general trial contexts, the percentage of owners reporting trial opportunities increased across the three time periods of 1975–78, 1979–80, and 1980–82.

Perhaps as important as pre-purchase trial opportunity, is the option of purchasing, for trial, a relatively inexpensive home computer model. One respondent bought a $499 Radio Shack TRS-80 as "a first step into the shallows." The purchase of a $100 Timex home computer could be the first step to a $3,000 IBM personal computer. The new presence of low-priced models in the consumer market should add markedly to the home computer's accessibility for trial.

A second aspect of the home computer's triability is its divisibility for trial, the "extent to which the innovation can be broken down to a set of components that can be implemented gradually with the benefit of feedback" (Zaltman and others, 1973). The multiple functionality and the multiple component nature of the home computer—factors which add to the home computer's *complexity*—both contribute to its divisibility. First, partial implementation could involve trial using only one or two functions—the entertainment or the educational functions, for example. This approach to buying limits the initial investment in software, as well as the learning effort involved.

Second, partial implementation could also take the form of initial investment in the basic "nucleus system," with the purchase of memory expansion modules, I/O subsystems and other add-on peripheral devices delayed until after the trial period.

We asked our respondents questions about peripheral devices currently owned, as well as those bought at the time of the initial purchase. On the average, respondents purchased one peripheral device initially, and purchased an additional peripheral later. We found a positive but low correlation ($r = 0.27$) between the number of peripherals purchased originally and the number currently owned. A crosstabulation of original purchases against presently-owned peripherals showed that 40 percent of our respondents who purchased no peripherals initially, eventually owned three or four, while respondents starting off with two or three peripherals, generally, did not add any more.*

There is clearly a logical relationship between the functional and the component aspect of divisibility for trial. A printer, for example, is more necessary for the word processing function than it is for the entertainment function. Crosstabulations of the number of peripherals purchased against the reported "main reason" for the home computer purchase allow us to tentatively note some patterns of association. First, the functions associated with low initial investment in peripheral components are "entertainment," "self-education," and "private business." Those associated with an initial purchase of two or more peripherals are "job-related work at home," and "child-education." The "private business" user among our respondents started with zero or one peripheral purchase; he/she generally ended up with three.

Adopter Characteristics and the Evaluation of Attributes

Diffusion theory has emphasized that it is the attributes of an innovation as *perceived by potential adopters* (rather than as defined by its inventors) that must be considered in predicting the rate of its adoption. One question addressed in the present study is how such "perception" or "evaluation" differs according to the characteristics of potential adopters. We found differences in evaluation associated with (1) income, (2) the number of children in the home, (3) expertise and (4) the work-orientation.

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*It could be postulated that this finding results from the limited availability of peripheral devices to the earliest adopters, who then later added several to their system. This, however, was found not to be the case. The number of peripherals purchased initially was not noticeably related to the year of purchase.

Income and Evaluation

While respondents in relatively higher income brackets (above $40,000/year) were not any less likely to mention the cost as a negative aspect of home computers, they were much less likely to mention cost as consideration in their choice of brands. Crosstabulations using dichotomized income variables showed a negative association for both personal and household income measures. About 70 percent of respondents reporting household incomes of less than $60,000 said that their choices were influenced by cost, while only 42 percent of those with higher incomes said the same. Household income is somewhat more strongly associated cost concerns.

Respondents in the higher income brackets were relatively less influenced by the programmability of the home computer than those earning less that $40,000. This relationship is even more pronounced when household income is used as the measure of wealth.

Children and Evaluation

There is a negative relationship between family size and immediate interest in owning a home computer.

At the same time, there were fewer perceived barriers to adoption. Whether or not cost is a factor in selecting a home computer brand is strongly associated with the number of children in the home. Respondents with children were much less likely to report considering the cost. While 56 percent of our respondents reported taking cost into account, 70–80 percent of those with two or there children did not report "cost" as a factor in their evaluation of the various brands.

Respondents with children were also less likely to report that they experienced problems using their home computers or to report breakdown problems.

While 34 percent of those without children reported that anticipated difficulties learning to use the home computer were a negative consideration prior to purchase, only 6 percent of with children did so. This may be a function of the level of anticipated use or prior experience on the part of the child.

Owners with two or more children at home were much less likely to report

being influenced by the expandability of the system in their choice of brands. While about 50 percent of those without children did consider expandability in making their purchase, only 10 percent of respondents with two or more childen did so.

Although computer games are often associated with children, respondents with childen were much less likely to mention the entertainment function as an advantage they considered prior to adoption. While 30 percent of our respondents without children mentioned the entertainment advantages of the home computer, only 19 percent of those with children did so.

Expertise and Evaluation

Prior computer expertise was positively associated with immediate interest in buying a home computer. Sixty-three percent of the more expert individuals in our sample reported immediate interest versus about 40 percent of other respondents.

About 40 percent of those with higher computer expertise saw the home computer as being an aid in work or business activities, while only 25 percent of other respondents mentioned this advantage.

Those with higher expertise were less likely to say that they had difficulties learning to use the system. Only 10 percent of this group reported that they had problems in comparison to 34 percent of other respondents. At the same time, they more often cited limitations of the home computer as negative aspects which they considered prior to purchase. They were less concerned than other adopters with the cost of the home computer.

Work-Orientation and Evaluation

We defined the "work-oriented" respondent as one who gave a work-related objective as the main reason for his or her purchase of their home computer and who reported using the home computer for predominantly work-related purposes.

We found that work-oriented respondents were much less likely to report learning problems than others interviewed. They were more likely than others to report that "software" was a factor in their evaluation of home computer brands. Sixty-five

percent of the more work-oriented respondents said that they were influenced by software considerations, while only 44 percent of other respondents said the same.

SOCIAL NETWORKS AND THE PATTERN OF HOME COMPUTER DIFFUSION

There is little doubt that the diffusion of various types of information is somehow influenced by social network structure (Friedkin, 1982). Much research has indicated that the opinion of one's peers plays an important role in individual decision-making. In this section, we examine some measures of social networks among home computer owners and their effect upon the rate of awareness and the rate of adoption.

Communication in Social Networks

At this relatively early stage in the diffusion of home computers, we would expect the networks to be limited, since the innovation has not yet had time to diffuse to a large population. However, social networks seem to have developed extremely quickly for home computers.

Communication from Previous Owners to Current Owners

The extent of interpersonal communication is surprising, considering that our sample was composed mostly of early adopters of home computers. As Table 15 indicates, computer owners knew, on the average, about five home computer owners before their purchase.

TABLE 15. NUMBER OF COMPUTER OWNERS OUR RESPONDENTS KNEW BEFORE PURCHASE

Number of Owners Known	Frequency	Percent of Responses	Cumulative Frequency
0	20	26.0	26.0
1	12	15.6	41.6
2	13	16.9	58.4
3	6	7.8	66.2
4	1	1.3	67.5
5	6	7.8	75.3
6	5	6.5	81.8
8	4	5.2	87.0
10–19	6	7.8	94.8
20–50	4	5.2	100.0
Totals	77	100.0	

Despite the average of five owners known by our respondents, the largest fraction

(26 percent) did not know any home computer owners before purchase; 16 percent of our respondents knew only one home computer owner; 17 percent knew only two. Thus, a total of 59 percent of our home computer adopters knew two or fewer adopters before their own purchase. The distribution among our respondents was skewed by a few adopters who knew an unusually large number of home computer owners. Nearly 10 percent knew 10 or more; one respondent claims to have known 50 adopters.

The influence of friends on the innovation-decision process was demonstrated earlier in this report. Of the two-thirds of our respondents who got experience with a home computer before purchase, 40 percent received some experience at a friend's home. Friends influenced the decision to adopt in 46 percent of the cases, and influenced the brand purchased in 43 percent of the cases. In addition, recommendations by friends influenced the place of purchase in 13 percent of the cases.

Communication from Current Owners to Future (Potential) Adopters

We delineate three ways in which ideas and opinions about home computers are communicated: (1) the number of people the owner talked to about his home computer (verbal communication), (2) the number of people the respondent showed the computer to (demonstration), and (3) the number of people the respondent encouraged to buy a computer (persuasion). All three indicators trace information flowing from the home computer owner to other people.

Figure 3 shows that verbal communication about home computers by their owners is quite extensive. The average home computer owner talked to nearly 13 people within the previous month about his home computer.

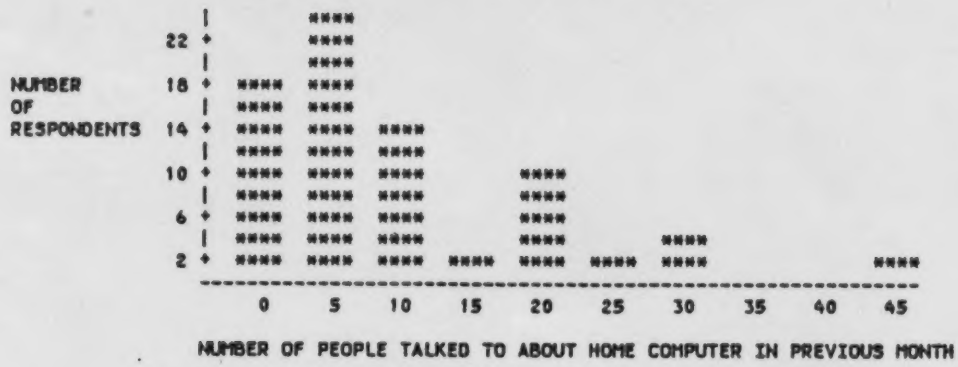

Figure 3. **Number of People Talked to about Home Computer in Previous Month.**

Demonstrating the home computer was not quite so common an activity (Figure 4). The average home computer owner exhibited his computer to about five other persons per month.

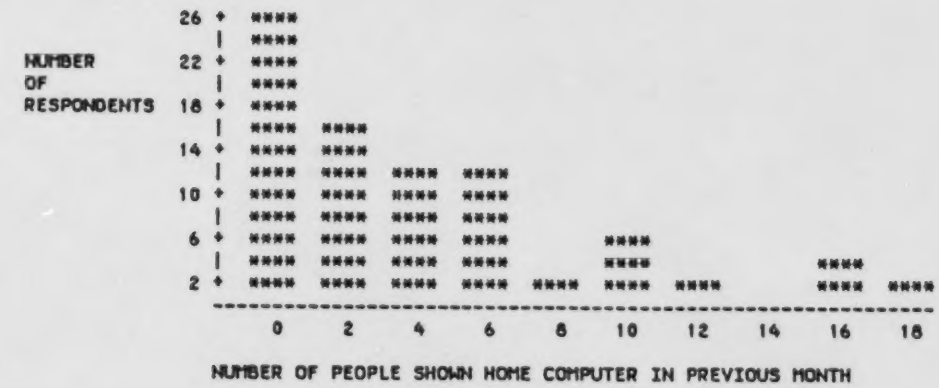

Figure 4. **Number of People Shown Home Computer in Previous Month.**

A third type of social interpersonal communication measured was persuasion. Figure 5 shows that a home computer owner tried to encourage an average of eight other persons to buy a home computer.

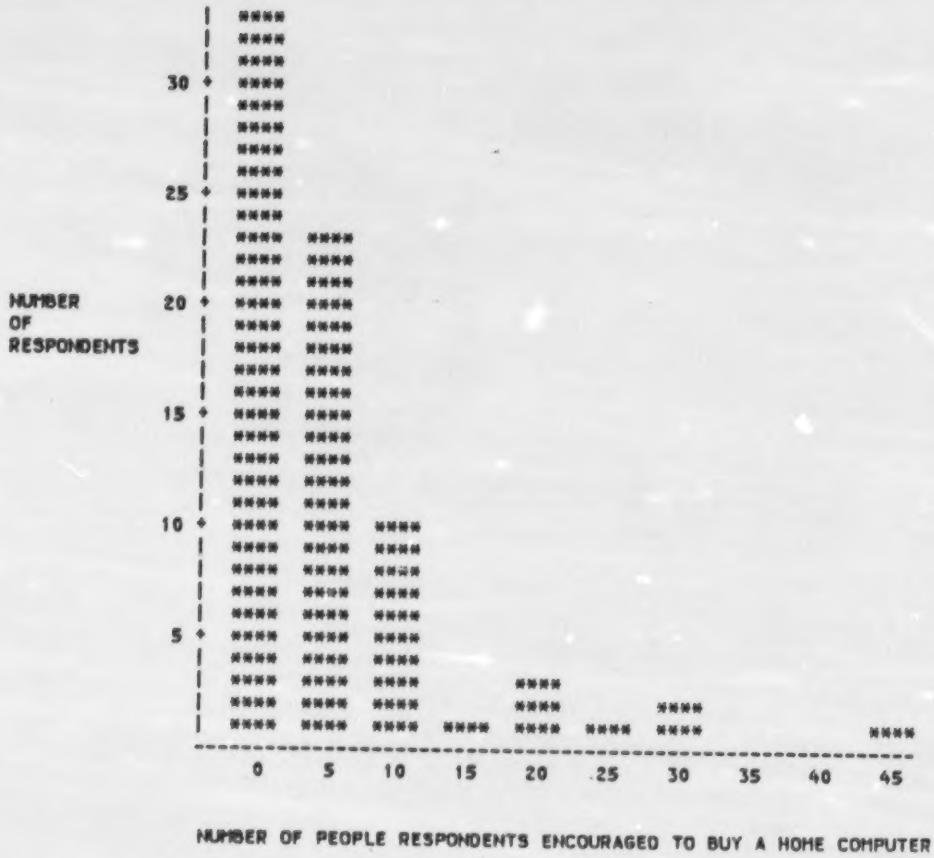

Figure 5. **Number of People Our Respondents Encouraged to Buy a Home Computer.**

Factor analysis of these variables found that verbal communication and demonstration loaded together on one dimension, so that they could be conceptualized as a single variable. Thus, people who talk about their computer with other people are likely to display their computer as well. Persuasion, on the other hand, was a separate factor, not linked to the other forms of communication.

Determinants of Interpersonal Communication

For each of the three communication activities (which will ultimately affect the

future rate of adoption), we found a large number of correlates. Multiple regression was introduced to isolate the most robust predictors.

In the case of verbal communication, we found that the largest determinant is the extent of the influence of friends on the owner's decision to adopt. Owners who are initially influenced by friends before purchase talk with more people about their home computer after their purchase. The second most important variable is personal income: verbal communicativeness also increases with income. As one's innovativeness in terms of video games and other video equipment increases, his talkativeness with others about his home computer decreases. Using the computer for entertainment predicts a greater amount of talking about one's home computer.

For the next type of communication, demonstration, the main determinant is the lack of experience with the home computer before purchase: owners who have little prior experience when they buy their home computer tend to show their computer to more friends afterwards. A second determinant of demonstrating one's home computer is the usage of the computer for entertainment, a factor that predicts higher levels of demonstration of one's home computer.

We found that persuasion is mostly a function of one's usage of his home computer for database access. The second determining factor is the owner making an instant purchase decision, deciding to adopt immediately at the awareness stage of the innovation-decision process. Owners who decide to purchase immediately upon hearing about home computers tend to encourage other people to buy a home computer. Last, the more experience a owner has before purchase, the more he encourages others to purchase a home computer.

What hypotheses do these data suggest?

First, using one's computer for entertainment appears to bear upon the owner's talking about and exhibiting his home computer. Conceivably, those who enjoy entertaining themselves with their home computers comprise a different set of people—who are, for some reason, more inclined to participate in interpersonal communication—than other owners. More likely, though, considering the importance of this factor in two different types of network activity, is that entertainment somehow helps an owner show off his computer or provides an interesting topic of conversation. The games on home computers commonly use multi-colored, flashing displays that are

often more interesting than data-processing or text-editing, which may explain the negative loading of video game innovativeness. Individuals who had previously purchased a video game player did not have the novelty of home computer games as a basis for talking about the home computer.

Second, while experienced users are less likely to show their home computer to others or to talk about it, they are more likely to persuade others to purchase a home computer. Experienced users may consider their home computer more as a tool than as a means of entertainment, but their familiarity with more practical functions allows them to persuade their companions to purchase a computer on these merits. There is a positive relationship between database use and persuasion. Entertainment use does not predict persuasion, although it is a very important factor in other communicative activities.

Third, pre-purchase behavior strongly influences post-purchase communicative behavior. For example, the degree of influence of friends prior to purchase correlates positively with talking with others after the purchase. Experience with home computers before purchase is negatively associated with one's exhibition of the computer, but correlates positively with persuasion of others to purchase one. Immediate interest in buying a home computer positively predicts the number of people a person will encourage to buy.

Content of Network Messages

Computer owners mainly receive positive messages from other computer owners before their purchase. As shown in Tables 16 and 17, positive messages outnumber the negative ones by two to one.

TABLE 16. POSITIVE RESULTS CONVEYED BY PREVIOUS HOME COMPUTER OWNERS TO RESPONDENTS.

Positive Result	Frequency	Percent of Responses	Percent of Cases
1. Entertainment	19	25.7	36.5
2. Text Processing	9	12.2	17.3
3. Education	9	12.2	17.3
4. Helps with office work	9	12.2	17.3
5. Helps with house work	6	8.1	11.5
6. Saves time	5	6.8	9.6
7. Other	17	23.0	32.7
Totals	74*	100.0	142.3

*52 of our 77 respondents cited a positive result conveyed by other owners. Each respondent could cite more than one.

TABLE 17. NEGATIVE RESULTS CONVEYED BY PREVIOUS HOME COMPUTER OWNERS TO RESPONDENTS.

Negative Result	Frequency	Percent of Responses	Percent of Cases
1. Software problems	11	29.7	39.3
2. Breakdowns	6	16.2	21.4
3. Cost	5	13.5	17.9
4. Difficult to use	3	8.1	10.7
5. Computer power	2	5.4	7.1
6. Other	10	27.0	35.8
Totals	37*	100.0	132.2

*28 of our 77 respondents cited a negative result conveyed by previous owners. Each respondent could cite more than one.

Paradoxically, despite the positive messages they receive, computer owners report many problems with their own computer. We found that 48 of the 77 respondents (64 percent) report they encounter problems with their home computer. Similarly, computer owners took an average of about one month before they felt comfortable with their computer. The frustrations and problems with home computers are masked by owners when presenting them to other people. Perhaps this is due to cognitive dissonance: the owner convinces himself of the merits of his purchase despite the

problems (Fishbein and Ajzen, 1975). Most owners, as noted earlier in this report, are very satisfied with their home computer purchase. In any case, the disadvantages of home computers are hidden to potential buyers in the content of network exchanges.

Moreover, the negative messages do not seem to affect home computer buyers' decisions. The disadvantages that home computer owners considered before purchasing a home computer are not the same as the ones they heard from previous owners. Indeed, home computer owners heard predominantly about technical problems from previous owners: 54 percent of the respondents mentioned that they heard from other home computer owners about such problems as breakdowns, problems with software, and difficulty in use, while 14 percent of the respondents heard that cost was the most important disadvantage. Yet, our home computer owners neglected consideration of technical problems anyway before purchasing their own home computer. As we stated previously, cost is the main perceived disadvantage (by 46 percent of the respondents), while difficulty in use, limited capability, problems with software, and poor computer memory comprised a total of only 32 percent.

On the other hand, the positive messages conveyed by other owners and the owners' own perceived *advantages* matched fairly closely. The major advantage in both cases was entertainment, followed by helping with office work, and education. The next two most-cited advantages were helping with housework and text-processing. The advantages of saving time and of saving money with the home computer were comparatively neglected both in the message content from previous owners and in the perceptions of our respondents.

The Context of Interpersonal Networks

What is the basis for the extensive interpersonal networks associated with home computer adoption? The fact that our respondents knew, prior to their own purchase, several home computer owners, suggests that potential home computer adopters know of other owners on some basis other than ownership. Our data suggest that the context for many interpersonal contacts is the work environment, and perhaps the existence of large timeshared computers there. Fully 80 percent of our respondents reported at least some use of a computer at their workplace. Work associates were the second most prominent source of information at the decision and implementation stages.

The Future Rate of Adoption

Given the increasing volume and favorable content of interpersonal communication regarding home computers, one would expect an increasing rate of adoption in the future. Evidence for rapid diffusion comes from a number of sources.

Date of purchase of a home computer and the total number of influences are positively correlated: later purchasers of home computers report more sources/channels of influences. Perhaps later purchasers are more cautious, waiting for information from more sources, while earlier adopters are apt to buy without as many influences. In effect, this would represent the characteristic difference between "innovators" and other adopters. A more reasonable interpretation, considering that early adopters generally have *more* access to mass media and interpersonal sources than later adopters, would be that the number of sources has rapidly increased. Thus, the finding is probably not an artifact of the adopters, but rather of the changes in the consumer environment. Indeed, the growth of influences is reflected in the increased awareness of home computer owners concerning computer brands: owners knew an average of 2.6 brands when they first heard about home computers, compared to an average of 7.9 brands in 1982.

The *diffusion effect* is the cumulatively increasing degree of influence upon individuals within a social system to adopt (or reject) an innovation. It results from the increase in knowledge of an innovation and its adoption (or rejection) over time. The overwhelmingly positive content of interpersonal evaluations of the home computer indicates that the diffusion effect will be positive—that is, once a certain threshold of knowledge of the innovation has been crossed, we may expect increasing systemic pressure towards adoption, rather than rejection. The extensiveness of interpersonal communication associated with home computers suggests an early threshold for the diffusion effect in home computers. Figure 6 shows the rate of adoption over time among our 77 respondents. There were marked increases in the rate of adoption from mid-1979 through 1982.

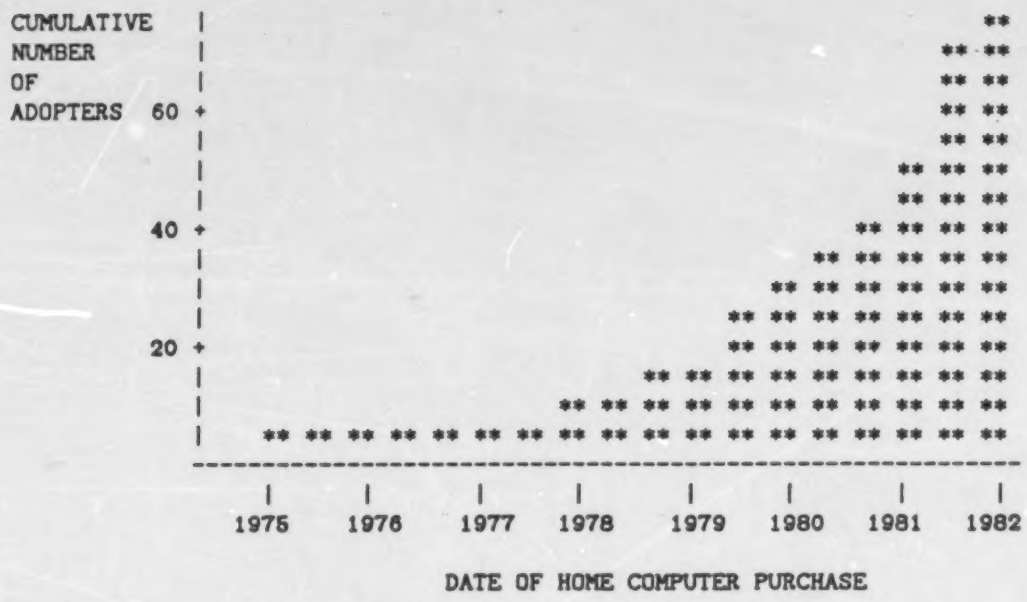

Figure 6. **Rate of Adoption for Our 77 Home Computer Owners**

Further evidence predicting rapid diffusion comes from the shortening of the adoption period. The adoption period is defined to be the period of time from awareness-knowledge to adoption in the individual innovation-decision process. This adoption period is negatively correlated to the adopter's date of awareness. As Table 18 shows, the adoption period for those first aware of home computers was about five years. This shortened markedly to a period of about 1.4 years for individuals who are more recently aware of home computers. Thus, later adopters take less time to make the decision to adopt after they are aware of home computers.

TABLE 18. SHORTENING OF THE ADOPTION PERIOD OVER TIME.

	Date when aware of home computers		
	1970–1976	1977–1978	1979–1982
Adoption Period	4.9	2.2	1.4

(Overall average for adoption period, $\bar{x} = 2.9$ years)

If recent adopters do indeed take less time to make the decision to adopt, along with a rapid growth in sources/channels of awareness, then we would expect a rapid influx of new adopters.

These factors suggest that, despite the rather low level of adoption of home com-

puters presently seen within the general U.S. population (about 2 percent), widespread adoption may soon occur, at least within certain social groupings. It may be the case that home computer diffusion (as evidenced in our sample) is now taking place within a restricted stratum of the total population. The extensive social networks that exist among the early adopters of home computers may reflect group homophily. Evidence for homophily comes from the demographic composition of our sample, of which the majority have advanced degrees, and over half have professional occupations. Other, more extensive surveys of home computer owners also reveal a generally homogeneous middle- to upper-class stratum.

Perhaps the appropriate model for understanding home computer diffusion from 1975 to the present is not a centralized model in which the driving force behind the process is the dissemination activities of the computer firms. Potential adopters gain their information, to a large extent, from home computer owners who are their peers. Such decentralized diffusion is characterized by the development and re-invention of innovations based on locally-perceived needs and problems, by the prominence of peer networks as channels of information, and by the use of situational criteria for evaluating the innovations. Home computer diffusion, at least in the present early stages, seems to have followed this decentralized pattern.

Adopters have relied increasingly on interpersonal sources/channels at the decision stage in the innovation-decision process: while 69 percent of our respondents purchasing before 1979 cited at least one interpersonal source/channel, almost all of the respondents (92 percent) purchasing after 1980 cited an interpersonal source of influence.

Nevertheless, the diffusion process for home computers may become increasingly centralized. A comparison of the factors at the awareness-knowledge stage among earlier adopters with those prominent among later adopters shows that general mass media sources/channels are playing a greater role in creating knowledge of home computers. For example, while over 40 percent of the earlier adopters (those purchasing prior to 1979) cited specialized computer/electronic magazines—which may be regarded as a form of peer dissemination—as their initial source of awareness, later adopters cited the general mass media sources more often. Very few of our respondents (10 percent) purchasing after 1979 cited specialized sources. In addition, adopters' reported knowledge of home computer brands indicates that brands, such as IBM and Atari, which have been prominently advertised in the mass media, have

a much higher salience than ownership alone would predict. Indeed, the growing consumer market for home computers and the entrance of large firms, including Japanese corporations, into the competition bodes toward increased centralization.

CONSEQUENCES OF HOME COMPUTER ADOPTION

Consequences are the changes that occur to an individual or to a social system as a result of the adoption or rejection of an innovation. One aspect of the consequences of home computers that we investigated is the uses to which our 77 respondents put their microcomputers in their households.

Uses of Home Computers

We asked home computer owners about the ways in which they or their family used the home computer. Table 19 summarizes the responses. The main types of usage, in order of prominence, are: (1) entertainment, (2) work-related word processing,* (3) personal word processing, (4) business management, (5) database access, (6) a learning aid for adults, (7) a learning aid for children, (8) home budgeting, and (9) home monitoring. Respondents were not specifically asked about the amount of time their home computer was used for programming or scientific computation. Five respondents mentioned using their home computer for such purposes.

TABLE 19. USES OF HOME COMPUTERS IN 77 HOUSEHOLDS.

Types of Use of Home Computer	Percent of the 77 Users Who Report at Least Some Use	Hours of Use per Week for All 77 Respondents	Range in Hours of Use per Week
1. Entertainment (e.g., games)	65	4.75	0–30
2. Personal word processing	52	2.48	0–40
3. Work-related word processing	48	2.65	0–24
4. Home budgeting	30	0.71	0–10
5. As a learning aid for children	23	0.92	0–20
6. As a learning aid for adults	31	1.51	0–20
7. Business management (e.g., accounting, investments)	38	2.25	0–20
8. Database access	39	1.87	0–30
9. For home monitoring (e.g., alarms, temperature control)	2	N/A	N/A
Totals	97	17.14	0–57

Our 77 respondents reported an average of somewhat more than 17 hours of

* *Word processing* is a term that IBM created in 1984 to describe electronic ways of conducting such usual office activities as composing, revising, printing, and filing correspondence and other written material.

home computer use per week. Figures 7 and 8 show that the total computer use by our 77 households of study ranged widely, from a low of none to a high of 57 hours per week. In most households the home computer was used between 5 and 20 hours per week. But about one quarter reported usage in excess of 25 hours per week. Most respondents reported regular usage of their home computer for three or four different functions.

Judging from these data, it seemed that the home computer had a major impact in our typical household of study, at least in terms of hours of use per week. The introduction of a computer in the typical home represents a very major shift in the use of time by the individual household members. Here are three of our 77 respondents, representing a low, medium, and high user.

1. Low-User: One of our respondents reported not using his home computer after an initial period in which he learned to program it in BASIC. This learning was mildly enjoyable, but for more than 12 months since then, the computer has just gathered dust. The owner, who received the computer as a gift, remarked that he felt computers (along with television and video games) were "the cancer of society." Only two of our 77 respondents were not using their microcomputers at the time of our data-gathering in Winter, 1982. Four respondents used their microcomputers for one to three hours per week.

2. Medium User: One of our respondents has been handicapped since an auto accident 18 years ago. He belongs to a computer network (called "Knowwhere") for handicapped people through which information is exchanged about health care and alternative forms of medicine. In addition, this individual, who is confined to a wheelchair, uses his home computer about 10 to 15 hours per week to do software programming for various clients. Certainly the microcomputer has greatly enriched the life of this respondent.

3. High User: Perhaps somewhat representative of our high users is a respondent who utilizes his microcomputer about 34 hours per week. The main use (30 hours per week) is for database access, mostly to CompuServe, local public "bulletin boards," etc. This respondent, a school teacher, is trying to find novel uses for his computer, such as creating models of reality that simulate processes or places. In addition, this individual uses his computer to generate colored patterns for artistic purposes, for work-related word processing, and for home budgeting. Since the

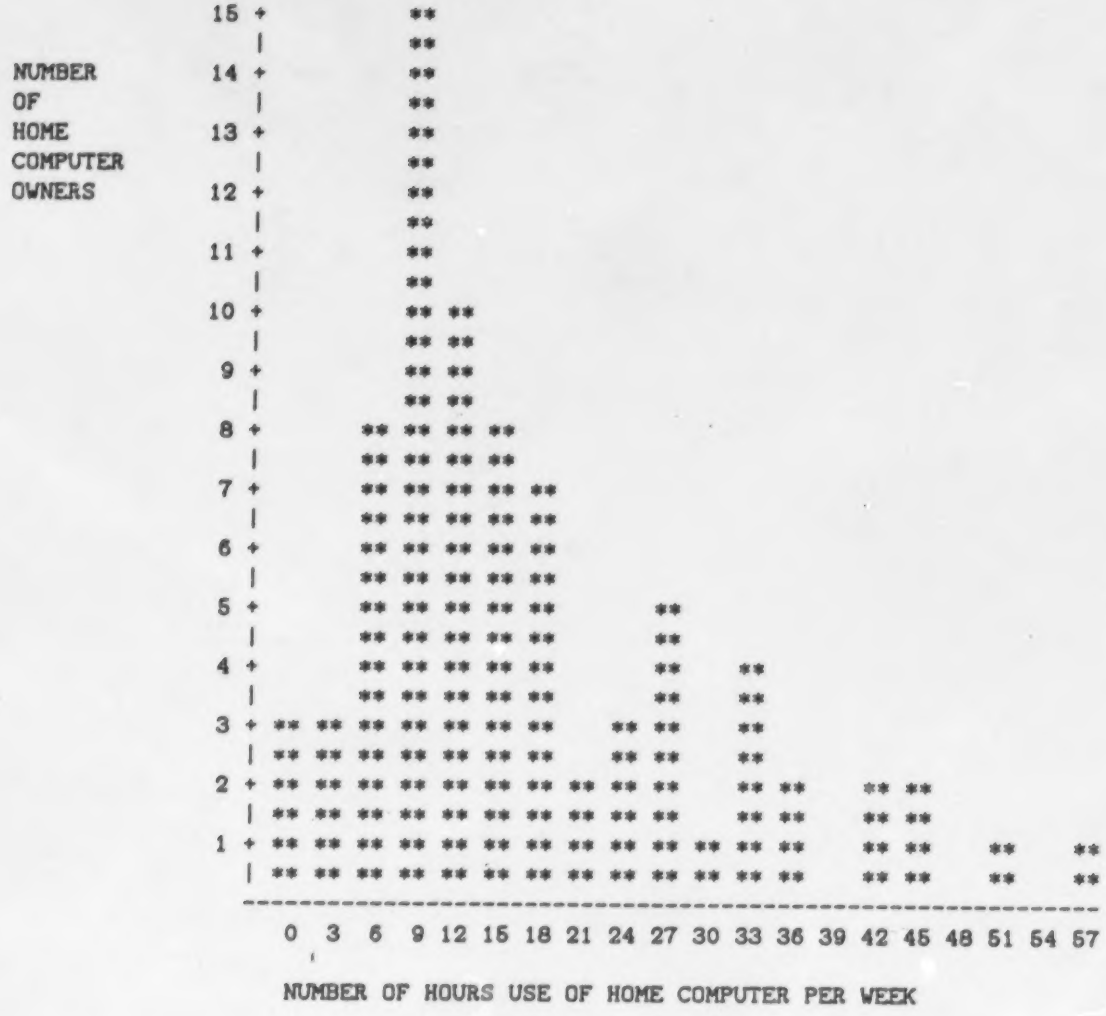

Figure 7. Frequency Distribution of Hours of Home Computer Use per Week

Numbers on the horizontal axis indicate midpoints of the range.

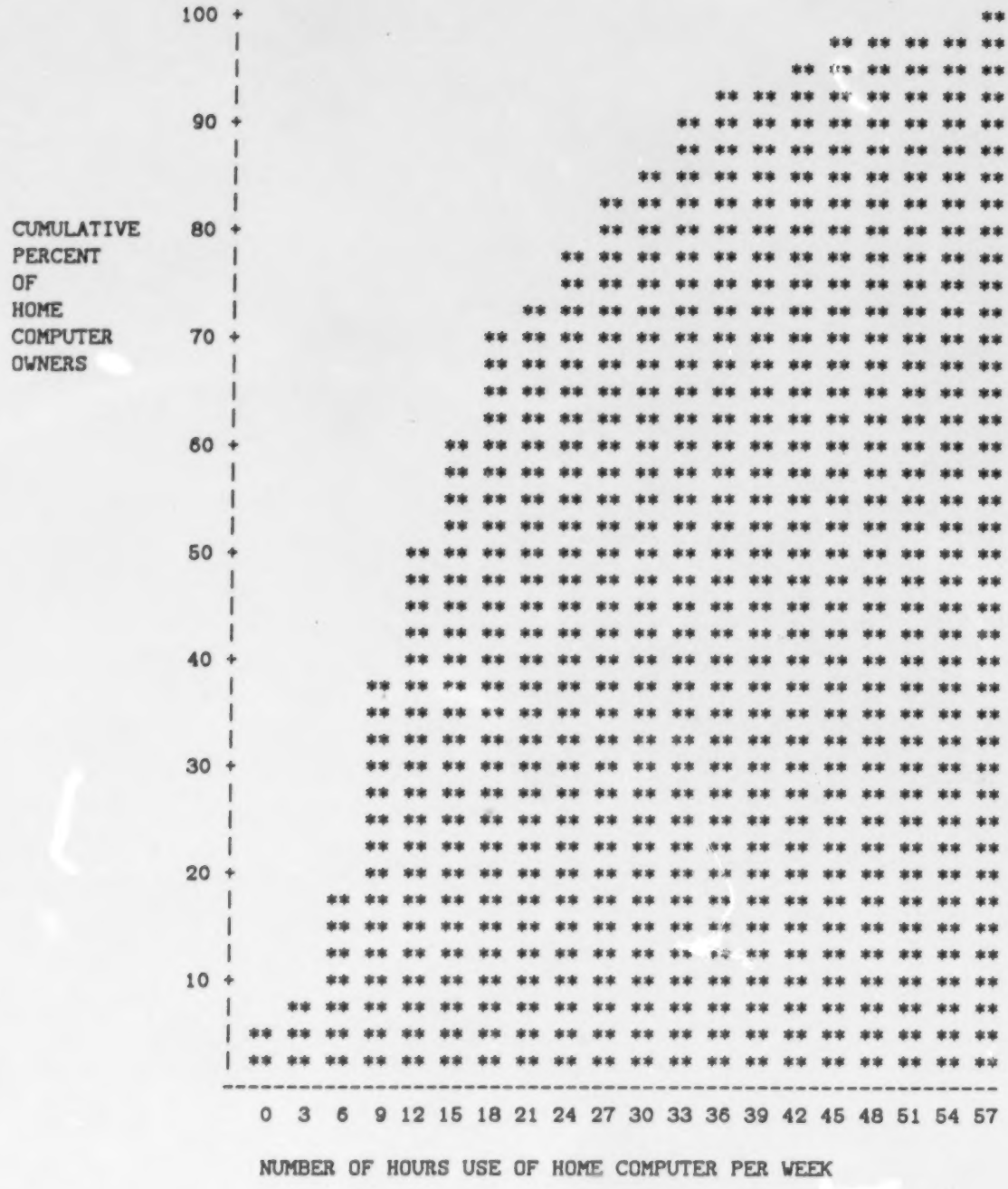

Figure 8. Cumulative Distribution of Hours of Home Computer Use per Week

Numbers on the horizontal axis indicate midpoints of the range.

purchase of the computer in 1978, this respondent reports it has almost completely restructured his time-use at home, with TV-watching falling to only about one hour per day.

* * *

We sought to interview the main user of the home computer in each of our 77 households of study. In addition to our respondents' uses of the home computer, 32 percent of the households reported that the respondent's spouse used the home computer, 21 percent said their children under 12 years of age used the computer, 35 percent reported that children older than 12 used the computer, and 4 percent reported use by other relatives (Table 20(a)). Considering only those families that had children, we see that the children in approximately half of the owners' households used the home computer (Table 20(b)). Children, especially those under 12 years of age, used the home computer to play games.

TABLE 20. MEMBERS OF THE FAMILY THAT USE THE HOME COMPUTER.

	(a) Total Sample		(b) Families with Children Under 18	
Family Member	Number	Percent of Cases	Number	Percent of Cases
Spouse	25	32.5	18	51.4
Children under 12	16	20.7	16	45.7
Older children	27	35.1	24	68.6
Relative	3	3.9	2	5.7
Totals	71*	92.2	60†	171.4

*46 of our 77 respondents gave an answer. Each respondent could list more than one family member.

†35 of our 77 respondents had children under 18 at home and gave an answer. Each respondent could list more than one family member.

One of the important uses of home computers by our 77 users is to utilize the home computer to link with a mainframe computer; 35 (46 percent) of our 77 home computer users reported utilizing their home computer as a means of linking with a mainframe computer. These mainframes, in decreasing order of importance, are: (1) LOTS (Low Overhead Time Sharing at Stanford University), (2) the Source, and (3) CompuServe.

Many of our 77 home computer users had certain specific uses for their home computer in mind at the time of their purchases, but 39 percent discovered new uses after their purchase. These new uses were mainly (1) for word-processing, and (2) for computer art. About 56 percent of our 77 respondents said that they had increased use of their home computer since its original purchase; only 14 percent reported decreased use.

Adopter Characteristics and Home Computer Use

A number of relationships between adopter characteristics and usage of the home computer are suggested by our data.

Income and Use

There is a strong positive association between personal income and usage of the home computer for work-related word processing. While about 30 percent of respondents with incomes above $40,000 reported relative high usage (4 or more hours per week) for work-related word processing, only 8 percent of those with lower incomes reported the same. Income is also positively associated with usage for database access, business management and as a learning aid for children. Personal income is negatively associated with usage for entertainment.

In general, higher income respondents reported usage in a greater number of categories. Thirty percent of higher income group reported five or more categories of use. No lower income owner reported usage in more than four categories.

Children and Use

As might be expected, the home computer was more often used for entertainment purposes in households with children. Usage for entertainment was particularly pronounced in households with two or more children—about 60 percent of these households fell into a "high entertainment use" category, in comparison to about 27 percent of households without children. It is important to note, however, that entertainment use is not solely a function of use by children: about 60 percent of households without children reported some usage for entertainment.

Expertise and Use

Expertise did not predict greater usage of the home computer. It was negatively associated with usage in the two most prominent categories of use: entertainment (games) and personal word processing. However, our respondents with greater computing expertise most probably had greater access to computing resources apart from their home computer. Forty-seven percent of our more expert adopters used their home computer to link to large time-sharing computer systems, in comparison to 37 percent of other owners.

Certain Impacts of Home Computer Adoption

We asked our 77 respondents what changes their home computer had caused: (1) "facilitates my work" (29 percent), (2) "increased my awareness of the computer world" (17 percent), (3) "changes my recreational activities" (14 percent), (4) "saves time" (12 percent), and (5) "allows me to spend time at home" (12 percent). Other less-important responses were: (1) "increases my computer knowledge," (2) "helps make more friends," (3) "makes money for me," (4) "provides access to information," and (5) "saves money."

We asked our 77 home computer users whether they found their home computer to be a money-saving device. About 35 percent responded positively to this question. The main money-saving functions of a home computer were (1) for budget-planning, and (2) for entertainment (games).

Another important impact of the adoption of a home computer is to save time. About 71 percent of our 77 owners reported this time-saving benefit. The main ways in which time was saved was in terms of (1) word processing, (2) problem-solving, and (3) invoices.

Once our typical respondent adopted a home computer, he was likely to engage in other computer-related activities: joining a computer users' club (about one-third had done so), and subscribing to computer magazines (70 percent did so). The most popular computer magazines for our 77 home computer users are: (1) *Byte* (47 percent), (2) *InfoWorld* (19 percent), and (3) *Creative Computing* (13 percent). Other computer magazines read by our respondents are *Personal Computing* (6 percent), *Computer World* (6 percent), *80 US* (4 percent), *Datamation* (1 percent),

and *Microage* (1 percent).

One of the major impacts of the adoption of a home computer in a household is an important decrease in the number of hours spent viewing television. In the average U.S. household, the television set is turned on for about six hours per day. Of our 77 adopters of study, 56 percent reported no change in their TV viewing. But 31 of the 77 households (40 percent) said they decreased television viewing by an average of 1.5 hours per day. One household reported an average decrease of four hours per day of TV watching. Only three households (4 percent) said they increased their TV viewing after their purchase of a home computer. So for all 77 households, the net effect of the home computer was an average decrease of about 34 minutes of TV viewing per day. This change represents a rather major shift in the use of time. It suggests that home computers may be more addictive than television.

DIRECTIONS FOR FUTURE RESEARCH

We feel that the present project is limited in the degree to which very much faith may be put in our specific research findings. The sample is too small and not sufficiently representative to allow definitive conclusions. Our findings, nevertheless, are useful leads for future studies of the diffusion of home computers.

We conclude our report, therefore, with a series of suggested research proposals to be pursued in further work.

Computers and Children

Our study showed that although children probably do not play a major role in the decision to purchase home computers, they are important users. We found that use of the home computer for children's education represents one reason for adopters to buy a home computer.

In 1980, U.S. schools had 52,000 computers available to students for educational purposes. This figure went up to 92,000 in 1981, and is expected to increase to more than 250,000 by 1984. About half of all secondary schools and 14 percent of elementary schools in the U.S. presently use computers. Unfortunately, very little is known from scientific study about the introduction, acceptance, and implementation of computers in schools, and the impacts of computers on teaching and learning by children in schools and in their homes.* But without doubt a kind of learning/teaching revolution is now underway, triggered by microcomputers.

Children appear to learn about computers with greater ease than do adults. Most observers note that boys are attracted to computers much more strongly than are girls. Further, home computers are more accessible, in both homes and schools, to socio-economically advantaged children, this serving to widen existing gaps between the "information-poor" and the "information-rich." For example, a 1982 survey of third, fourth, and seventh grade children in selected California schools illustrates

*Most U.S. schools do not yet have enough computers for them to make an important educational impact. Ideally, every school should have at least 15 computers, so that a class of 30 students could use the equipment. Currently, the subjects most frequently taught with computers are math, language arts, reading, social studies, and science.

this gap: 41 percent of the children in an upper-middle class school reported they had a home computer, compared to less than 1 percent in a nearby Spanish-speaking lower-income school.*

A whole generation of U.S. children will grow up with computers, much as the children of the 1950's grew up with television. What is different and special about computers is that they are *interactive*. It is this interactive nature of computers (and of related communication technologies based on computers) that marks a cultural turning point away from the passivity of viewing television.

Whether the instructional potential of the computer will be exploited by schools and teachers, or whether computers will just go the way that television has gone (largely relegated to providing entertainment programming in order to sell commercial products) remains to be seen. Needed is an early study of the present and future impacts of computers, and the translation of these research findings into public policy.

Fortunately, Professor Wilbur Schramm of Stanford University conducted a study of the impact of television on U.S. children in the 1950's. The findings of this important study are reported by Wilbur Schramm, Jack Lyle, and Edwin B. Parker (1961) in their book, *Television in the Lives of Our Children*. Re-reading this book today suggests implications for an investigation of the impact of computers on children. For instance, consider the research questions guiding the television study:

1. Does television deepen the ignorance or broaden the knowledge of children?
2. Does television debase the tastes of children?
3. Does television distort children's values?
4. Does television teach children too much about life too early?
5. Does its violence teach children violence and crime?
6. Does television cause withdrawn and addictive behavior?
7. Does television widen "information gaps" between socio-economic elite families and non-elite families (that is, those who adopt TV earlier and later)?

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*These data come from an investigation of the effect of television viewing on children's reading, directed by Professor Donald Roberts of Stanford's Institute for Communication Research.

The research design that Schramm and others utilized, with some appropriate modifications, could fit a present-day investigation of computers and children. Certainly, the earlier questions imply a suspicion of the negative effects of TV on children. On the contrary, our hopes for the effects of computers are mainly positive. But the research methodologies used by Schramm and others may be applied directly. They gathered data from 5,991 students, 1,958 parents, and from several hundred teachers, school officials, and other knowledgeable persons in 10 communities. Today, one might wish for some in-depth case studies of computers and children. In fact, our colleagues Bill Paisley and Milton Chen (1982) recently conducted some exploratory research on exemplary uses of computers for children.

It should be noted that Schramm and others almost waited too long to conduct their research on TV and children. In fact, they had to go to Canadian communities to find a location without TV that could be matched with a TV community. Television had spread very rapidly in the U.S.: in 1950 one in 15 U.S. homes had television; by the end of the decade 7 of 8 homes had it.

We can't wait long to launch a comparable study of computers and children.

Computers are a mass medium, but of a very special kind in that they are highly personalized or individualized, due to their interactive nature. It is possible that the use of computers may affect how we think; some observers feel that children who grow up with computers will learn to be more logical and to think in linear sequences. We need to find out. Seymour Papert (1980, p.9) stated:

> I believe that the computer presence will enable us to so modify the learning environment outside the classroom that much if not all the knowledge schools presently try to teach with such pain and expense and such limited success will be learned, as the child learns to talk, painlessly, successfully, and without organized instruction. This obviously implies that schools as we know them today will have no place in the future.

Computer Users' Clubs

An unusual aspect of home computer adopters is that many of them join users' clubs, local associations of owners of some brands of computers (for example, Apple

users' clubs, Radio Shack users' clubs, etc.). In our present survey, 32 percent of the 77 adopters belonged to a computer users' club.

There are an estimated 2,000 computer users' clubs in the U.S. today. One reason for the popularity of users' clubs is that they provide a means of reinforcement and social support for adopters of a particular brand of computer. A good deal of training also takes place at club meetings through speakers and via the informal exchange of members' experiences. And there is one additional function of users' clubs: they provide a handy means for "pirating" software programs. One member will purchase a new software program for, say, $200, and then bring it to a users' club meeting, where he will exchange copies of it on floppy disks for copies of other software programs. Such acts of piracy are illegal, of course, but very difficult to prevent.

In the U.S., most users' clubs are specialized by brand (e.g., Apple, TRS, etc.), but not in Japan, where most local clubs belong to the national-level Japanese Microcomputer Users' Club. Will such a national association of local clubs also develop in the U.S.? What types of information do home computer users learn from each other in users' clubs? How important are users' clubs in providing social reinforcement and support to members? How might users' clubs act to speed up the rate of diffusion of home computers? The importance of peer networks in the diffusion of certain innovations suggests that these issues merit further research.

Office Automation

Personal computers are having a big impact in the office, as well as the home.

The majority of the computer equipment now being purchased for office use is in a much higher price bracket than the personal computer. An example is the Xerox Star, which costs about $15,000 and serves as a word processor, provides electronic filing and retrieval of documents, and facilitates electronic messaging. Demand for these expensive office computer systems has developed more slowly than expected. Microcomputers help fill this gap, and many are now being installed in offices as low-cost word processors. One observer notes that personal computers are "spreading through the office like the plague" (Uttal, 1982). That may be an overstatement, but it is true that microcomputers are now playing an important role in office automation.

Our study indicates that many of the advantages of home computers are work or business related. The development of a "work station" for the home may become a future trend as the use of home computers for work purposes increases.

We still need to understand the impacts of office automation, both positive and negative (such as the displacement of clerical workers). We also need to understand the relationship between the use of microcomputers in the office environment and their use and impact in the home.

The Diffusion of Microcomputers in the Third World

Will the miniaturization of computers continue to the point where their cost might decrease enough for them to become affordable in the developing nations of Latin America, Africa, and Asia? What impacts will microcomputers have in the Third World?

Some observers (like Servan-Schreiber, 1980) are optimistic. They see microcomputers helping the Third World catch up with industrialized nations in their rate of development, by jumping over much of the industrial era and moving directly into becoming information societies. As one example of the many possible applications of microcomputers in developing nations, we might think of using a microcomputer (linked with sensing equipment) for self-diagnosis of certain health problems in a local clinic which has an inadequate professional staff.

Computers also may be used to replace labor in factory settings in the Third World, such as textile factories, thus greatly increasing unemployment rates. Labor is one of the factors of production available in abundance in most Third World nations. If the introduction of computers substitutes capital-intensive technology for this labor, the results may be increased unemployment, along with greater factory efficiency.

Whether the impacts of microcomputers in developing nations will be mainly positive or negative is an important topic for future investigation.

The Future Rate of Adoption of Home Computers

Home video games were found in 3.5 percent of U.S. households in 1980 (we found that 35 percent of our respondents had adopted video games). Video cassettes, a technology introduced in 1978, were adopted by 5 percent of households by 1982 (and by 17 percent of our respondents). These are very rapid rates of adoption.

Will home computers follow a similarly fast rate of adoption in future years? Will 100 percent of U.S. households eventually adopt home computers? Are the same households that have adopted home video games, videotape recorders, cable TV, and other new information technologies also the adopters of home computers? Our study noted an increasing rate of diffusion within our sample of home computer adopters, and suggested factors which may explain this. We also identified characteristics of home computer adopters that may help us predict future trends in adoption.

One attempt at predicting the future rates of adoption for home computers has been made by Professor Jack Nilles, a faculty member in the Business School at the University of Southern California, using the Delphi technique. A set of knowledgeable experts provided the high-growth and the conservative estimates shown in Figure 9.

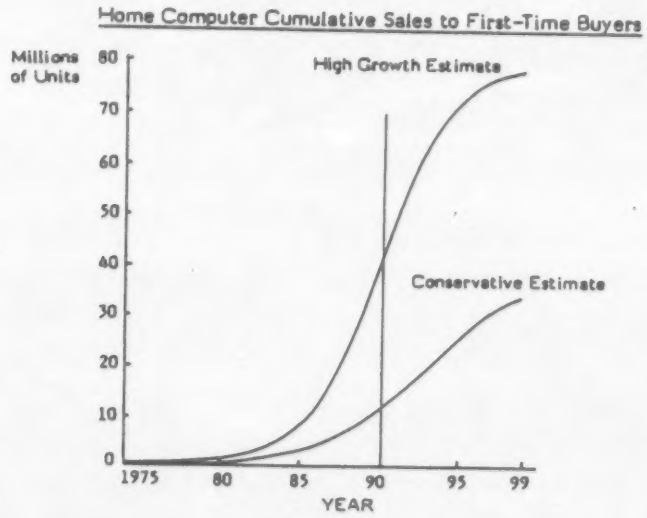

Figure 9. **Estimates of the Future Rate of Adoption for Home Computers.**

If the actual rate of adoption were half-way between Nilles's two projections,

there would be 28 million home computers in 1990. The actual rate of adoption could be affected by an "invasion" of Japanese home computers (expected to begin in 1982), by a sharply decreased price for home computers (Timex has recently announced a $100 home computer), and by the improved availability of software (one of the major problems mentioned by our 77 adopters).

We need further study of these and other factors that affect the rate of adoption of home computers.

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APPENDIX A

STUDENTS ENROLLED IN COMMUNICATION 167/267/VTS 172

DIFFUSION OF INNOVATIONS, WINTER, 1981–1982

STUDENTS ENROLLED IN COMMUNICATION 167/267/VTS 172

DIFFUSION OF INNOVATIONS, WINTER 1981–1982

Name	Major	Status
Albert, David	Communication	Junior
Allen, Andrew	Applied Comm. Research	Graduate
Allahmagani, Katuka	Communication	Senior
Antola, Livia	Applied Comm. Research	Graduate
Ball, Max	Communication	Senior
Baume, Carol	Education	Graduate
Bentzen, Erik	Education	Graduate
Brenzel, Logan	Human Biology	Senior
Coffey, Tom	Human Biology	Senior
Cohen, Sylvie	Communication	Graduate
Cole, Jason	Undeclared	Sophomore
Coplan, Jeff	Math/Science	Sophomore
Cortina, Elisabeth	Values, Tech. & Society	Senior
Davis, Jeff	Engineering	Senior
De Vera, Grace E.	Education	Graduate
De Luzuiaga, Concepcion	Applied Comm. Research	Graduate
De Costa, Bob	Sociology	Senior
Del Rio Goudie, Sebastian	Communication	Graduate
Donnell, Catherine	Communication	Senior
Fedler, Lawrence	Communication	Senior
Friedman, Amy	Human Biology	Junior
Hicks, Frank	Human Biology	Senior
Houts, March	Communication	Junior
Kekorian, Dara	Undeclared	Sophomore
Kosnik, Tom	Business/Marketing	Graduate
Leander, Stacy	Human Biology	Senior
Leglise, Claude	Business/Marketing	Graduate
Leslie, Lisa	Human Biology	Junior
Madsen, Leza	Applied Comm. Research	Graduate
Magpayo, Diva	Human Biology	Senior
McIntyre, Bryce T.	Communication	Graduate

Name	Major	Status
Motzfeldt, Sissel	Visiting	Graduate
Mullings, Blossom	Applied Comm. Research	Graduate
Murphy, Laura	Engineering	Junior
Myers, Christine	Communication	Graduate
Noss, Sara	Communication	Senior
Okelo, Meda	Applied Comm. Research	Graduate
Orvanaños, Alejo	Communication	Graduate
Pripps-Huertas, Marianne	Applied Comm. Research	Graduate
Prystas, Elizabeth	Human Biology	Senior
Puteh, Sharifah Nor	Education	Graduate
Reader, Cynthia	Communication	Graduate
Ridder, John	Applied Comm. Research	Graduate
Salisbury, Cindy	Business/Marketing	Graduate
Salvo, Natasha	Economics/Communication	Senior
Sheldon, Susan	Economics/Communication	Senior
Smith, Jeannine	Engineering	Junior
Smith, David	Communication	Sophomore
Smith, Robert	Engineering	Graduate
St. Clair, George	Education	Graduate
Stewart, Marian	Applied Comm. Research	Graduate
Stratigos, Anthea	Communication	Junior
Subramaniam, Chitra	Communication	Graduate
Swan, Chip	Engineering	Junior
Tan, Michelle	Economics/Communication	Senior
Wheeler, Cindi	Communication	Sophomore
Whitford, Irma	Visiting	Scholar
Wiebelhaus, Roger	Communication	Senior
Wu, Tom	Engineering	Senior
Yuan, Luyang	Communication	Graduate

APPENDIX B

ABSTRACTS OF AWARD-WINNING STUDENT PAPERS ON THE DIFFUSION OF HOME COMPUTERS

ABSTRACTS OF AWARD-WINNING STUDENT PAPERS ON THE DIFFUSION OF HOME COMPUTERS

1. *Influences and Home Computers: A Comprehensive Study*, by Thomas D. Wu

The purpose of this paper is to determine the factors most influential in determining a person's behavior with respect to home computers. Six clusters of independent variables and six clusters of dependent variables were found by factor analysis.

The two most influential independent variables are socio-economic status and interpersonal influence. The two most important dependent factors from the factor analysis are communicativeness and data-base use. Correlational analysis of twelve independent and dependent variables concerned adopter categories, the innovation-decision process, and attributes of the innovation of home computers. The brand of computer purchased is related most closely to socio-economic status, interpersonal (as opposed to mass media) channel use, and amount of data-base use. The primary type of computer use is most closely related to socio-economic status.

2. *Home Computer Adoption by Scientists and Engineers*, by Sylvie Cohen and Maita C. R. de Luzuriaga

The survey of 77 home computer adopters allowed us to suggest a specific profile of the innovation-decision process among the sub-sample of scientists and engineers.

1. At the Awareness Stage:

   - Their relatively earlier awareness and their higher levels of information about more sophisticated home computers.

2. At the Persuasion Stage:

   - Their lesser concern with the cost of this new technology and with the implication of its adoption on their lifestyle.
   - Their greater opportunity to use a computer at work.
   - Their greater degree of contact with prior owners and with individuals at their workplace.

3. At the Decision Stage:

   - They chose the computer brand purchased according to the advice of work colleagues, friends, and print media articles.

   - They bought their home computer relatively earlier and spent more money for it (than did adopters other than scientists/engineers).

4. At the Implementation Stage:

   - They felt comfortable in using their computer more quickly.

   - They use their home computer less than do other adopters for such purposes as entertainment and word-processing.

5. At the Confirmation Stage:

   - They are more satisfied with their home computer.

   - A larger proportion of scientists/engineers decreased their amount of TV viewing since they bought their home computer.

   - A greater proportion of them belong to a home computer users' club and read computer journals.

   - They encouraged a greater number of their acquaintances to adopt a home computer.

Our exploratory study indicates that scientists and engineers are a clearly-defined market segment in terms of their rapid adoption of home computers, their uses of it, and their communication networks centered with other adopters.

3. *The Innovation-Decision Process in Home Computer Adoption: Quick Decisions, Lengthy Adjustments*, by Marian Stewart

This paper examines the innovation-decision process for home computer adoption in order the answer the question: "Are the types of decision considerations generally appropriate to the adoption of so complex a technology?" The 77 home computer users reported a general lack of consideration (prior to purchase) of the

home computer's possible impact on their lifestyle. Adopters generally spend little time studying and investigating the innovation before making their purchase. The author argues that the adopter's interpersonal sources are far more persuasive than they are reliable in the decision to purchase a home computer.

4. *The Diffusion of Home Computers*, by Bryce McIntyre

This paper reports (1) that interpersonal channels play a more important role than do mass media channels in creating awareness of home computers, (2) that interpersonal channels play a greater role than do mass media advertising and marketing efforts in persuading people which brand to buy, and (3) that owning a home computer is related to a reduction in time spent viewing television. Four other hypotheses were not supported: (1) that one's attitudes toward technology are related to time of adoption, (2) that people who think computers are hard to learn take longer to make a decision to purchase, (3) that there is a positive relationship between time of adoption and individual innovativeness, and (4) that reduction in the adoption period between awareness of home computers and the time of purchase is positively related to the number of owners known when the purchase actually was made.

5. *Marketing Mooch: A Computer Simulation Game*, by Michelle Tan

This paper describes and documents an interactive computer game developed by the author. The game is designed to simulate the purchase of home computers, and is based upon data obtained from our 77 users and from the computer manufacturers. The objective of the game is to market the MOOCH 761, a newly-developed home computer. This game seeks to enhance understanding of the diffusion of a technological innovation like home computers. The game runs on the Stanford University LOTS system.

6. *Marketing Strategies and the Diffusion of Home Computers*, by Stacey Leander, Claude Leglise, Cindy Salisbury, Chip Swan, and Roger Wiebelhaus

This paper summarizes personal and telephone interviews conducted with home computer manufacturers in order to understand their marketing strategies. The home computer companies included (1) the pioneers (Apple, Commodore, and Tandy), (2) the home market targeters (Atari, Sinclair, and Texas Instruments), (3) traditional manufacturers of computing equipment (Hewlett-Packard, IBM, and Xerox), and (4)

normal Japanese manufacturers.

The analysis divides these computer manufacturers into five categories based upon their internal characteristics and their approaches to marketing their respective products: (1) consumer electronics manufacturers, (2) office equipment manufacturers, (3) small business computer and terminal manufacturers, (4) traditional mainframe manufacturers, and (5) personal computers-only manufacturers.

The innovators in adopting home computers were the hobbyists and engineers, the early adopters are mostly business people, and the early majority will include a more diverse spectrum of consumers. Home computers first appeared in 1975, the early adopters phase was attained during 1981, and it is estimated that the innovation will reach the early majority category in 1983.

Products have evolved to follow the changing characteristics of the adopters as the home computer diffuses through society. Marketing for mass adoption has been announced recently by several companies. Other firms have already chosen market niches and will probably maintain more focused strategies. The ultimate rate at which personal computers diffuse in the U.S. may be impeded by either software development problems or public policy questions.

APPENDIX C

SUMMARIES OF STUDENT PAPERS ON THE DIFFUSION OF HOME COMPUTERS

SUMMARIES OF STUDENT PAPERS ON THE DIFFUSION OF HOME COMPUTERS

A. Functions of the Home Computer

1. Chitra Subramaniam, *CompuServe: Delivering the Newspapers to Home Computers.* Reviews the progress of the CompuServe "electronic newspaper" experiment. Two conclusions are: (1) that the experiment may have been initiated too early in the home computer diffusion cycle and (2) that most of the home computer owners who utilize the service are hobbyists who use their home computer for recreational or creative purposes and do not see it as a news channel.

B. The Innovation-Decision Process

1. Sebastian Del Rio, *Innovativeness and the Home Computer.* Suggests that innovativeness in home computer adoption is strongly related to prior general knowledge of the technology.

2. March Hout, *Factors Influencing Home Computer Adoption.* Concludes that interpersonal networks are currently the major sources of influence in the innovation-decision process for home computers.

3. Blossom Mulling, *Perceived Complexity and Home Computer Adoption.* Suggests that along with cost, problems with obtaining, understanding, and using home computer software are the major factors slowing the rate of home computer adoption.

4. Bob DeCosta, *Income and Home Computer Adoption.* The data do not show a relationship between earliness of home computer adoption and personal income among home computer owners.

C. Characteristics of Home Computer Users

1. Meda Okeio, *Comparison of Home Computer Adopters and Non-Adopters.* Notes differences between users and non-users in their attitudes toward technology and the role of computers in society.

2. Laura Murphy, *Personal Computers: At Work in the Home.* Finds that persons buying a home computer in order to work at home tend to have more technical backgrounds and prior familiarity with computers. Those who purchase their home computer primarily as a tool later began to use it for recreational purposes, and vice versa.

D. Effects of Home Computers

1. Katuka Allahmagani, *The Personal Computer and its Social Change Potential.* Examines the impact of home computers on family and social interaction.

2. Alejo Orvanaños, *Opinion: Home Computers will Bring about Some Changes in Society.* Studied the opinions of home computer owners toward the present and potential future role of home computers in society.

3. Sharifah Nor Puteh and Marianne Pripps-Huertas, *The New Social Machine.* Addresses the myriad of social implications caused by widespread adoption of home computers.

4. Luyang Yuan, *Home Computer Diffusion: Some Social Implications.* Notes that home computer owners perceive the impacts as very positive.

E. Cross-Technology Comparisons

1. Dara Kerkorian, *Home Computers in the Evolution of Communication Technology.* Traces the diffusion of the telephone and television as a basis for forecasting the prospects for the home computer. The home computer may have to piggy-back on the public acceptance of the telephone and television if it is to avoid the problems of complexity and incompatibility as hindrances to widespread adoption.

2. Leza Madsen, *Diffusion of Home Computers and Television in the U.S.: A Comparative Study.* Compares the diffusion for the two communication technologies in terms of early adopter characteristics, motivations for purchase and their impact of lifestyles.

F. Future Alternatives and the Potentials of Home Computers

1. Elisabeth Cortina, *Home Schooling and the Home Computer.* Addresses the ways in which the home computer could solve some of the problems that home schooling has faced in the past, but notes that current diffusion trends tend to minimize the potential educational benefits of home computers.

2. Max Ball, *The Shape of Things to Come.* Looks at the information access potential of home computers and speculates about the possible repercussions of a large scale entry by AT&T into the videotext/microcomputer field.

3. Jeff Davis, *The Qwerty Legacy and Our Data Entry Future.* Surveys current data entry alternatives and the pressing reasons for adoption of new keyboard modes and other alternatives.

APPENDIX D

ADOPTER QUESTIONNAIRE

HOME COMPUTER DIFFUSION PROJECT

User Questionnaire

Institute for Communication Research
Stanford University

1-2 bb

3-4 |__ __|

5-7 | _ _ _ |

INTERVIEWER: _____

INTERVIEWEE: _____ PHONE: _____

Hello, my name is _____ and I am a student at Stanford University. As part of the work in one of my courses, I am talking with people about their use of home computers.

(DO NOT READ THE CATEGORIES LISTED UNDER QUESTIONS UNLESS THE INSTRUCTION "READ" APPEARS AFTER THE QUESTION. INSTEAD, CHECK THE RESPONSE CATEGORY THAT CORRESPONDS TO THE RESPONDENT'S ANSWER. IF NONE OF THE RESPONSE CATEGORIES CORESPONDS TO WHAT THE RESPONDENT SAID, CHECK "other" AND WRITE IN THE DETAILS.)

8-9 bb

1. Let me begin by asking where, or from whom, you first heard about home computers? (PLEASE RECORD IN DETAIL)

_____

_____

10-11 |__ __|
12-13 |__ __|

2. About when was this? __ __ year/__ __ month

_____

3. Think back to when you first heard about home computers. Which brands of home computers were you aware of at that time? (PROBE, BUT DO NOT READ LIST)

14-16 | _ _ _ |
17-19 | _ _ _ |
20-22 | _ _ _ |
23-25 | _ _ _ |

[1] Apple [2] Radio Shack [3] Atari [4] IBM
[5] Hewlett Packard [6] Commodore PET [7] Xerox
[8] NEC [9] Sharp [10] Osborne [11] Sinclair
[12] Other (specify) _____

4. Which brands are you aware of now?

26-28 | _ _ _ |
29-31 | _ _ _ |
32-34 | _ _ _ |
35-37 | _ _ _ |

[1] Apple [2] Radio Shack [3] Atari [4] IBM
[5] Hewlett Packard [6] Commodore PET [7] Xerox
[8] NEC [9] Sharp [10] Osborne [11] Sinclair
[12] Other (specify) _____

38-39 bb

40 |__|

5. When you first heard of home computers, were you immediately interested in owning one?

[1] no [2] yes

6. While you were deciding whether or not to buy a home computer, what did you think were the main advantages of owning one? (IF INTERVIEWEE HAS MORE THAN ONE HOME COMPUTER, NOTE THAT DECISION QUESTIONS RELATE TO THE FIRST DECISION)

41 b

_____ 1. _____

_____ 2. _____

42 b

7. What were the main negative aspects?

_____ 1. _____

_____ 2. _____

43 |__|

8. While you were deciding whether or not buy one, did you consider how a the home computer would affect your lifestyle?

[1] no [2] yes
IF YES, in what ways?

44 _____ b

_____

_____

45-46 |__ __|

9. Before you purchased your home computer, how many people did you know who owned one?

__ __ number

47-48 bb

10. What positive results of using a home computer did they convey to you?

_____

_____

_____

49-50 bb

11. What negative results?

_____

_____

_____

51 |__|

12. There are several ways in which people may get experience using a home computer before they buy one. For example, at work, at a friend's house, practicing at a computer store. Did you get a chance to use a home computer before you bought one?

[1] no [2] yes
IF YES, Where did you use one? (CHECK ALL THAT APPLY)

52 |__| [___] At work

53 |__| [___] At a friend's home

54 |__| [___] In a computer store

55 |__| [___] Anywhere else? (specify): _____

13. Where, or from whom, did you get information that influenced your decision to purchase a home computer? (CHECK ALL THAT APPLY)

56 |__| [___] a friend
57 |__| [___] a relative
58 |__| [___] a work associate
59 |__| [___] work place
60 |__| [___] computer store

61 |__| [___] newspaper articles
62 |__| [___] popular magazine articles
63 |__| [___] specialist/hobbyist magazine articles
64 |__| [___] TV shows
65 |__| [___] newspaper advertising
66 |__| [___] popular magazine advertising
67 |__| [___] specialist/hobbyist magazine advertizing
68 |__| [___] TV advertising
69 |__| [___] other (specify):_____

14. What was your main reason for buying a home computer?

70-71 bb

_____

_____

72-73|__ __|
74-75|__ __|

15. When did you buy your home computer?

__ __ year/ __ __ month

76 |__|

16. Was there any special event that triggered your decision to purchase a home computer?

[1] no [2] yes
IF YES, explain _____

77-78 bb
79-80 bb
Caseline 2

_____

17. Where, or from whom, did you get information that influenced the brand of home computer you purchased? (CHECK ALL THAT APPLY)

1 |__| [___] a friend
2 |__| [___] a relative
3 |__| [___] a work associate
4 |__| [___] work place
5 |__| [___] computer store

6 |__| [___] newspaper articles
7 |__| [___] popular magazine articles
8 |__| [___] specialist/hobbyist magazine articles
9 |__| [___] TV shows
10 |__| [___] newspaper advertising
11 |__| [___] popular magazine advertising
12 |__| [___] specialist/hobbyist magazine advertizing
13 |__| [___] TV advertising
14 |__| [___] other (specify):_____

18. What factors most influenced your decision as to what brand of home computer to buy? (CHECK ONES MENTIONED AND PROBE: "Any other major factor...?")

15 |__| [___] cost

16 |__| [___] availability of software

17 |__| [___] programability (languages,power)

18 |__| [___] ability to expand with peripherals

19 |__| [___] size and reputation of manufacturer

20 |__| [___] ability to interface with other systems

21 |__| [___] ability to link with friends and associates

22 |__| [___] Other major factor that influence decision:

_____ _____

23 |__| 19. How many sellers of home computers did you contact before you purchased your home computer? __

24 |__| 20. Where did you purchase your home computer?

[1] computer store
[2] electronics store selling stereos and other electronic equipment
[3] manufacturer's store
[4] direct mail from manufacturer
[5] another individual (a used computer)
[6] other (specify) _____

21. Why did you buy it from there? (CHECK ALL THAT APPLY)

25 [__]
26 [__]
27 [__]
28 [__]
29 [__]
30 [__]
31 [__]
32 [__]

[___] The salesperson.
[___] A friend recommended them.
[___] They carried the products I wanted to buy.
[___] They offered the lowest price.
[___] They offered the most help in learning how to use the computer.
[___] They carry a broad selection of computers.
[___] Other (specify) _____

33-34 [__ __]

22. What brand did you buy?

[1] Apple [2] Radio Shack [3] Atari [4] IBM
35-36 [__ __] [5] Hewlett Packard [6] Commodore PET [7] Xerox
[8] NEC [9] Sharp [10] Osborne [11] Sinclair
[12] Other (specify) _____
37-38 [__ __]

(IF INTERVIEWEE OWNS MORE THAN ONE, ASK: Which brands have you bought since then? 1.__ __; 2.__ __ (USE CODE FROM ABOVE))

39-43 _____

23. Approximately how much have you spent for your computer, including peripherals? $

_____

24. What peripheral equipment have you bought in addition to the computer?

(USE Q.22 CODES)

44 [__]
45-46 [__ __]
47-48 [__ __]
49-50 [__ __]
51-52 [__ __]

[1] none
[2] printer (IF BOUGHT, ASK:) What brand? _____
[3] disc drive (IF BOUGHT, ASK:) What brand? _____
[4] modem (IF BOUGHT, ASK:) What brand? _____
[5] other (specify)_____ What brand? _____

53-56 bbbb
57 [__]

25. Which peripherals did you buy initially (when you bought the computer)? __ (USE CODE FROM ABOVE)

58 [__]

26. Did you buy a service plan?

[1] no [2] yes

59-60 bb
61-63 [_ _ _]

27. How many days or weeks did it take you to feel comfortable using your home computer?

__ days

__ __ weeks (CODER, TRANSLATE INTO DAYS: __ __ __ days)

64 [__]

28. On a scale of 1 to 7 (seven being extremely satisfied), how satisfied are you with your home computer?

[1] [2] [3] [4] [5] [6] [7]
Very dissatisfied Very satisfied

65 |__|

29. Did you encounter any problems using your home computer?

[1] no [2] yes
IF YES, What were they? (PROBE: was it a serious problem of a minor problem? CHECK APPROPRIATE CATEGORY)

		Serious	Minor
66 |__|	difficulties learning to use the system	[2]	[1]
67 |__|	breakdowns	[2]	[1]
68 |__|	lack of useful programs	[2]	[1]
69 |__|	problems ("bugs") in the programs	[2]	[1]
70 |__|	unclear written instructions (documentation)	[2]	[1]
71 |__|	other (specify) _____	[2]	[1]

72-80 b..b
Caseline 3

(INTERVIEWER NOTE: "USE" QUESTIONS RELATE TO WHICHEVER HOME COMPUTER OR COMPUTERS ARE PRESENTLY OWNED)

30. Approximately how many hours per week is your home computer used for the following purposes: (READ. OBTAIN TOTAL TIME BY ALL HOUSEHOLD MEMBERS)

		hours/week
1-2 |__ __|	[1] entertainment (e.g., games)	__ __
3-4 |__ __|	[2] personal word processing (e.g., letters)	__ __
5-6 |__ __|	[3] work-related word processing	__ __
7-8 |__ __|	[4] home budgeting	__ __
9-10 |__ __|	[5] learning aid for children	__ __
11-12 |__ __|	[6] learning aid for yourself	__ __
13-14 |__ __|	[7] business management (e.g., accounting, investments)	__ __
15-16 |__ __|	[8] database access	__ __

17 |__|

31. Do you use your home computer for home monitoring (alarms, temperature control etc.)?

[1] no [2] yes

18 |__|

32. Do you ever link up, by phone, to any large timesharing or database computer system such as the SOURCE, COMPUSERVE, DIALOG, or a University computer network?

[1] no [2] yes
IF YES, which ones: _____

19-20_____
21-22_____
23-24_____
25-26_____

what programs do you access? _____

what information do you access? _____

27 |__|

33. After you purchased your home computer, did you discover any uses for it which you hadn't thought of before buying?

[1] no [2] yes
IF YES, then what were they?

28-29_____
30-31_____

32 b |__|

34. Which members of your family use the home computer?
(CHECK ALL THAT APPLY, AND PROMPT: For what purpose, primarily?)

(USE Q.30 CODES)

33-34 |__ __|
35-36 |__ __|
37-38 |__ __|
39-40 |__ __|
41-42 |__ __|

[___] Spouse Main use: _____
[___] Children under 12 Main use: _____
[___] Older children Main use: _____

43 |__|

35. Where in the house do you keep your home computer?

44-45 bb

[1] study
[2] living room
[3] bedroom
[4] family room
[5] kitchen
[6] den
[7] other (specify) _____

46 |__|

36. Have you found your home computer to be a money-saving device?

[1] no [2] yes
IF YES, how has it saved you money?
[1] budget planning
[2] shopping
[3] energy saving
[4] entertainment
[5] other (specify)
_____

47 |__|
48 |__|
49 |__|
50 |__|
51 |__|
52-53 bb

54 |__|

37. Have you found your home computer to be a time-saving device?

[1] no [2] yes
IF YES, how has it saved you time?

55-56_____
57-58_____

_____

_____

59 |__|

38. Since you bought your home computer, has your use increased, decreased, or stayed the same as when you first bought it?

[1] increased [2] the same [3] decreased

60 |__|

39. Do you plan to sell your home computer in the near future?

[2] no
IF YES, do you plan to buy another model?
[1] no [3] yes
IF YES, which brand? _____

61-62 |__ __|

63-65 | _ _ _ |

40. Would you say that your total amount of TV viewing has increased, or decreased, since you bought your home computer?

[2] no change
[3] increased: By about how many hours per day? ___
[1] decreased: By about how many hours per day? ___

66 |__|

41. Have you talked to other people about your home computer? (ASIDE FROM OTHER HOUSEHOLD MEMBERS)

[0] no
IF YES, How many people have you talked to in the last month? __ __ people.

67-68|__ __|

42. Do you show people your computer when they visit your home?

[0] no
IF YES, how many people in the last month? __ __ persons

69-70|__ __|

43. Have you encouraged any other person to buy a home computer?

[0] no
IF YES: How many people? __ __ persons

77-78 bb

44. If you need help in the operation of your home computer, to whom do you go for help? (CHECK ANY THAT APPLY)

71 |__|
72 |__|
73 |__|
74 |__|
75 |__|
76 |__|
77-80 bb

[1] seller
[2] friend
[3] work/business associate
[4] computer manual
[5] computer school (teacher)
[6] other (specify) _____

Caseline 4
1 |__|

45. Do you belong to a home computer club?
[1] no [2] yes
IF YES, which one? _____

2-4 ____

46. Now we would like to ask your opinion on the role of computers in society. Please indicate your whether you agree, disagree, strongly agree or strongly disagree with each of these statements. (DK= DON'T KNOW OR NO OPINION) First: (READ)

		SA	MA	DK	MD	SD
5 |__|	Computers will replace interaction with other people.	[5]	[4]	[3]	[2]	[1]
6 |__|	Computers are too complited for most people to ever understand.	[5]	[4]	[3]	[2]	[1]
7 |__|	The development of technology will provide solutions for most of the problems of the world.	[5]	[4]	[3]	[2]	[1]
8 |__|	Computers should not be used to play games.	[5]	[4]	[3]	[2]	[1]
9 |__|	Home computers will enhance family life.	[5]	[4]	[3]	[2]	[1]
10 |__|	Computers will replace newspapers and magazines as we know them today.	[5]	[4]	[3]	[2]	[1]
11 |__|	Computers threaten to destroy individual privacy.	[5]	[4]	[3]	[2]	[1]

12-13 bb

14 |__|

47. Do you read any computer journals?

[1] no [2] yes
IF YES, which ones? _____

15-16 ____
17-18 bb

48. Do you own any of these products? If so, in what year did you first purchase it?

		Year (e.g., 78)
19-20 |__ __|	[ ] Sony Walkman (or similar product)	__ __
21-22 |__ __|	[ ] food processor	__ __
23-24 |__ __|	[ ] programmable calculator	__ __
25-26 |__ __|	[ ] video tape recorder	__ __
27-28 |__ __|	[ ] digital watch	__ __
29-30 |__ __|	[ ] video games	__ __
31-32 |__ __|	[ ] microwave oven	__ __
33-34 |__ __|	[ ] solar panels	__ __

35 |__|

49. Do you use a computer at work?

[1] no
IF YES, are you:
[2] an end user (key punch, word processing,etc.)
[3] a programmer
[4] an engineer
[5] a technician
36-37 bb [6] other (specifiy) _____

38 |__|

50. Where did you first learn to use a computer?

[1] school
[2] work
[3] friends
[4] manuals (documentation)
[5] clubs
[6] other (specify) _____

39 |__|

51. Do you know any computer languages?

[1] no [2] yes
40-42_____ IF YES, what languages? _____

SAY: And now, just a few questions for background information:

43 |__|

52. Do you have any children, under 18, living at home?

[0] no
IF YES: how many? __

44 |__|

53. What is your level of formal education?

[1] grade school
[2] high school
[3] some college
[4] bachelor's degree
[5] master's degree
[6] PhD

45-46 |__ __| 54. What is your current occupation? _____

47-48 |__ __| 55. May I ask whether you are in your 20's, 30's 40's, 50's or 60's (etc.). (START WITH YOUR BEST GUESS--EG. "30'S OR 40'S") __ __

49-50|__ __|

56. Into which of the following income brackets would your personal income fall? (READ. START AT "20 TO $30,000" OR YOUR BEST "LOW GUESS")

[1] 0 to $10,000
[2] 10 to $20,000
[3] 20 to $30,000
[4] 30 to $40,000
[5] 40 to $50,000
[6] 60 to $70,000
[7] 70 to $80,000
[8] 80 to $90,000
[9] 90 to $100,000
[10] Above $100,000

51-52|__|

57. Into what bracket would your combined household income fall?
___ (USE CODE FROM ABOVE)

58. Finally, what would you say were the main changes that the home computer brought about for yourself or your family?

53-54_____ 1. _____

55-56_____ 2. _____

57-58_____ 3. _____

59-60 bb

59. Is there anything important that we have not touched upon?

61-62_____ _____

63-64_____ _____

65-66 bb

67 |__|

60. (SEX: [1] Female [2] Male, DO NOT ASK!!)

(SAY: "Thank you for taking this time to help in our study of home computer use. In the next month, we will be tabulating the results and copies of a report will be available on request. ")

(RECORD ANY NECESSARY OR USEFUL COMMENTS HERE, AFTER LEAVING THE HOUSEHOLD)

_____

_____

_____

_____

_____

_____

_____

FOR OFFICE USE: INITIALS

Checked for completeness ____

Checked for internal consistency ____

Problems for verification:

_____

APPENDIX E

NON-ADOPTER QUESTIONNAIRE

HOME COMPUTER DIFFUSION PROJECT

Non-adopter Questionnaire

Institute for Communication Research
Stanford University

1-2 bb

3-4 |__ __| INTERVIEWER: _____

5-7 | _ _ _ | INTERVIEWEE: _____ PHONE: _____

Hello, my name is _____ and I am a student at Stanford University. As part of the work in one of my courses, I am talking with people about home computers.

(DO NOT READ THE CATEGORIES LISTED UNDER QUESTIONS UNLESS THE INSTRUCTION "READ" APPEARS AFTER THE QUESTION. INSTEAD, CHECK THE RESPONSE CATEGORY THAT CORRESPONDS TO THE RESPONDENT'S ANSWER. IF NONE OF THE RESPONSE CATEGORIES CORESPONDS TO WHAT THE RESPONDENT SAID, CHECK "other" AND WRITE IN THE DETAILS.)

8-9 bb

1. Let me begin by asking where, or from whom, you first heard about home computers? (PLEASE RECORD IN DETAIL)

_____

_____

10-11|__ __|
12-13|__ __|

2. About when was this? __ __ year/__ __ month

_____

3. Think back to when you first heard about home computers, which brands of home computers were you aware of at that time? (PROBE, BUT DO NOT READ LIST)

14-16| _ _ _ |
17-19| _ _ _ |
20-22| _ _ _ |
23-25| _ _ _ |

[1] Apple [2] Radio Shack [3] Atari [4] IBM
[5] Hewlett Packard [6] Commodore PET [7] Xerox
[8] NEC [9] Sharp [10] Osborne [11] Sinclair
[12] Other (specify) _____

4. Which brands are you aware of now?

26-28| _ _ _ |
29-31| _ _ _ |
32-34| _ _ _ |
35-37| _ _ _ |

[1] Apple [2] Radio Shack [3] Atari [4] IBM
[5] Hewlett Packard [6] Commodore PET [7] Xerox
[8] NEC [9] Sharp [10] Osborne [11] Sinclair
[12] Other (specify) _____

38-39 bb

40 |__|

5. When you first heard of home computers, were you immediately interested in owning one?

[1] no [2] yes

6. What would you think are the main advantages of or owning a home computer.

41 b

_____ 1. _____

_____ 2. _____

42 b

7. What are the main negative aspects in your view?

_____ 1. _____

_____ 2. _____

43 |__|

8. Have you considered how owning a home computer might affect you lifestyle?

[1] no [2] yes
IF YES, in what ways?

44 _____ b

_____ _____

45-46|__ __| 9. How many people do you know who own a home computer?

__ __ number

47-48 bb 10. What positive results of using a home computer did they convey to you?

_____ _____

_____ _____

49-50 bb 11. What negative results?

_____ _____

_____ _____

72-73|__ __| 12. When, in the future, would you predict that you might own a home computer?

74-75|__ __| __ __ year/ __ __ month

Caseline 4

14. Now we would like to ask your opinion on the role of computers in society. Please indicate your whether you agree, disagree, strongly agree or strongly disagree with each of these statements. (DK= DON'T KNOW OR NO OPINION) First: (READ)

		SA	MA	DK	MD	SD
5 |__|	Computers will replace interaction with other people.	[5]	[4]	[3]	[2]	[1]
6 |__|	Computers are too complited for most people to ever understand.	[5]	[4]	[3]	[2]	[1]
7 |__|	The development of technology will provide solutions for most of the problems of the world.	[5]	[4]	[3]	[2]	[1]
8 |__|	Computers should not be used to play games.	[5]	[4]	[3]	[2]	[1]
9 |__|	Home computers will enhance family life.	[5]	[4]	[3]	[2]	[1]
10 |__|	Computers will replace newspapers and magazines as we know them today.	[5]	[4]	[3]	[2]	[1]
11 |__|	Computers threaten to destroy individual privacy.	[5]	[4]	[3]	[2]	[1]

12-13 bb

14 |__|

15. Do you read any computer journals?

[1] no [2] yes
IF YES, which ones? _____

15-16_____
17-18 bb

16. Do you own any of these products? If so, in what year did you first purchase it?

		Year (eg. 78)
19-20|__ __|	[ ] Sony Walkman (or similar product)	__ __
21-22|__ __|	[ ] food processor	__ __
23-24|__ __|	[ ] programmable calculator	__ __
25-26|__ __|	[ ] video tape recorder	__ __
27-28|__ __|	[ ] digital watch	__ __
29-30|__ __|	[ ] video games	__ __
31-32|__ __|	[ ] microwave oven	__ __
33-34|__ __|	[ ] solar panels	__ __

35 |__|

17. Do you use a computer at work?

[1] no
IF YES, are you:
[2] an end user (key punch, word processing, etc.)
[3] a programmer
[4] an engineer
[5] a technician
36-37 bb [6] other (specifiy) _____

38 |__|

18. Where did you first learn to use a computer?

[1] school
[2] work
[3] friends
[4] manuals (documentation)
[5] clubs
[6] other (specify) _____

39 |__|

19. Do you know any computer languages?

[1] no [2] yes
40-42_____ IF YES, what languages? _____

SAY: And now, just a few questions for background information:

43 |__|

20. Do you have any children, under 18, living at home?

[0] no
IF YES: how many? __

44 |__|

21. What is your level of formal education?

[1] grade school
[2] high school
[3] some college
[4] bachelor's degree
[5] master's degree
[6] PhD

45-46|__ __| 22. What is your current occupation? _____

47-48|__ __| 23. May I ask whether you are in your 20's, 30's 40's, 50's or 60's (etc.).. (START WITH YOUR BEST GUESS--EG. "30'S OR 40'S") __ __

49-50|__ __| 24. Into which of the following income brackets would you personal income fall? (READ. START AT "20 TO $30,000" OR YOUR BEST "LOW GUESS")

[1] 0 to $10,000	[6] 60 to $70,000
[2] 10 to $20,000	[7] 70 to $80,000
[3] 20 to $30,000	[8] 80 to $90,000
[4] 30 to $40,000	[9] 90 to $100,000
[5] 40 to $50,000	[10] Above $100,000

51-52|__| 25. Into what bracket would your combined household income fall? ___ (USE CODE FROM ABOVE)

26. Is there anything important that we have not touched upon?

61-62_____ _____

63-64_____ _____

65-66 bb

67 |__| 27. (SEX: [1] Female [2] Male, DO NOT ASK!!)

(SAY: "Thank you for taking this time to help in our study of home computers. In the next month, we will be tabulating the results and copies of a report will be available on request. ")

(RECORD ANY NECESSARY OR USEFUL COMMENTS HERE, AFTER LEAVING THE HOUSEHOLD)

_____

_____

_____

_____

_____

_____

_____

FOR OFFICE USE: INITIALS

Checked for completeness _____

Checked for internal consistency _____

Problems for verification:

_____

APPENDIX F

RESPONSE FREQUENCIES FOR THE ADOPTER QUESTIONNAIRE

HOME COMPUTER DIFFUSION PROJECT

RESPONSE FREQUENCIES TO USER QUESTIONNAIRE

1. Let me begin by asking where, or from whom, you first heard about home computers? (PLEASE RECORD IN DETAIL)

	COUNT	PCT OF RESPONSES	PCT OF CASES
GENERAL MEDIA	14	21.2	25.0
COMPUTER-ELEC MAG	12	18.2	21.4
SCHOOL TEACHER	9	13.6	16.1
WORK-COLLEGUES	13	19.7	23.2
FRIENDS	5	7.6	8.9
FAMILY	4	6.1	7.1
STORE-REPRESENTATIVE	5	7.6	8.9
ELECTRONIC HOBBY	1	1.5	1.8
OTHER	3	4.5	5.4
TOTAL RESPONSES	66	100.0	117.9

21 MISSING CASES 56 VALID CASES

2. About when was this? __ __ year/__ __ month

YEARHRD YEAR WHEN HEARD ABOUT HOME COMPUTERS

	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1951.	1	1.3	1.4	1.4
1960.	1	1.3	1.4	2.8
1965.	1	1.3	1.4	4.2
1971.	2	2.6	2.8	6.9
1973.	1	1.3	1.4	8.3
1974.	1	1.3	1.4	9.7
1975.	10	13.0	13.9	23.6
1976.	5	6.5	6.9	30.6
1977.	13	16.9	18.1	48.6
1978.	17	22.1	23.6	72.2
1979.	10	13.0	13.9	86.1
1980.	9	11.7	12.5	98.6
1981.	1	1.3	1.4	100.0
-1	5	6.5	MISSING	100.0
TOTAL	77	100.0	100.0	

MEAN	76.569	MEDIAN	77.559	STD DEV	4.427
VALID CASES	72	MISSING CASES	5		

MONTHHRD MONTH WHEN HEARD ABOUT HC

	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
DON'T KNOW	27	35.1	38.6	38.6
JANUARY	5	6.5	7.1	45.7
FEBRUARY	9	11.7	12.9	58.6
MARCH	1	1.3	1.4	60.0
APRIL	1	1.3	1.4	61.4
MAY	3	3.9	4.3	65.7
JUNE	6	7.8	8.6	74.3
AUGUST	2	2.6	2.9	77.1
SEPTEMBER	5	6.5	7.1	84.3
OCTOBER	4	5.2	5.7	90.0
NOVEMBER	3	3.9	4.3	94.3
DECEMBER	4	5.2	5.7	100.0
MISSING VALUE	7	9.1	MISSING	100.0
TOTAL	77	100.0	100.0	

MEAN	3.757	MEDIAN	1.833	STD DEV	4.241
VALID CASES	70	MISSING CASES	7		

3. Think back to when you first heard about home computers. Which brands of home computers were you aware of at that time?

	COUNT	PCT OF RESPONSES	PCT OF CASES
APPLE	49	25.9	67.1
RADIO SHACK	35	18.5	47.9
ATARI	12	6.3	16.4
IBM	10	5.3	13.7
HEWLETT PACKARD	12	6.3	16.4
COMMODORE PET	28	14.8	38.4
XEROX	3	1.6	4.1
NEC	3	1.6	4.1
SHARP	3	1.6	4.1
OSBORNE	3	1.6	4.1
SINCLAIR	3	1.6	4.1
OTHER BRANDS INITIALLY AWARE OF	28	14.8	38.4
TOTAL RESPONSES	189	100.0	258.9

4 MISSING CASES 73 VALID CASES

OTHER BRANDS INITIALLY AWARE OF

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ FREQ (PERCENT)
ALTAIR-MITS	6	7.8	21.4	64.3
IMSAI	2	2.6	7.1	71.4
ZILOG	1	1.3	3.6	75.0
DEC	1	1.3	3.6	78.6
NCR	1	1.3	3.6	82.1
ALTOS	1	1.3	3.6	85.7
OTHER	4	5.2	14.3	100.0
OUT OF RANGE	49	63.6	MISSING	100.0
TOTAL	77	100.0	100.0	

VALID CASES 28 MISSING CASES 49

4. Which brands are you aware of now?

	COUNT	PCT OF RESPONSES	PCT OF CASES
APPLE	75	12.4	97.4
RADIO SHACK	70	11.5	90.9
ATARI	61	10.0	79.2
IBM	71	11.7	92.2
HEWLETT PACKARD	53	8.7	68.8
COMMODORE PET	62	10.2	80.5
XEROX	44	7.2	57.1
NEC	30	4.9	39.0
SHARP	29	4.8	37.7
OSBORNE	38	6.3	49.4
SINCLAIR	32	5.3	41.6
OTHER BRANDS NOW AWARE OF	42	6.9	54.5
TOTAL RESPONSES	607	100.0	788.3

0 MISSING CASES 77 VALID CASES

OTHER BRANDS NOW AWARE OF

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ FREQ (PERCENT)
TEXAS INSTRUMENTS	6	7.8	14.3	14.3
ALTAIR-MITS	1	1.3	2.4	16.7
ZILOG	1	1.3	2.4	19.0
DEC	1	1.3	2.4	21.4
NCR	2	2.6	4.8	26.2
ALTOS	1	1.3	2.4	28.6
OTHER	30	39.0	71.4	100.0
OUT OF RANGE	35	45.5	MISSING	100.0
TOTAL	77	100.0	100.0	

VALID CASES 42 MISSING CASES 35

5. **When you first heard of home computers, were you immediately interested in owning one?**

BUYIMMED IMMEDIATE INTEREST IN BUYING HC

	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ FREQ (PERCENT)
NO	1	36	46.8	46.8	46.8
YES	2	41	53.2	53.2	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

6. **While you were deciding whether or not to buy a home computer, what did you think were the main advantages of owning one? (IF INTERVIEWEE HAS MORE THAN ONE HOME COMPUTER, NOTE THAT DECISION QUESTIONS RELATE TO THE FIRST DECISION)**

PERCEIVED ADVANTAGES IN HC

	CODE	COUNT	PCT OF RESPONSES	PCT OF CASES
WORK-BUSINESS	1	22	17.2	28.6
PERSONAL ACCOUNTS	2	16	12.5	20.8
EDUCATION	3	17	13.3	22.1
WORD PROCESSING	4	13	10.2	16.9
HOBBY-FUN-GAMES	5	22	17.2	28.6
SAVE TIME	6	3	2.3	3.9
PERSONAL PROGRAMMING	7	6	4.7	7.8
SAVE MONEY	8	5	3.9	6.5
OTHERS	9	24	18.8	31.2
	TOTAL RESPONSES	128	100.0	166.2

0 MISSING CASES 77 VALID CASES

7. **What were the main negative aspects?**

PERCEIVED DISADVANTAGES IN HC

	CODE	COUNT	PCT OF RESPONSES	PCT OF CASES
COST	1	47	46.1	67.1
HARD TO USE,LANGUAGE	2	13	12.7	18.6
FEAR OF OBSOLESCENCE	3	6	5.9	8.6
LIMITED CAPABILITY	4	9	8.8	12.9
PROB'S WITH SOFTWARE	5	9	8.8	12.9
POOR MEMORY	6	2	2.0	2.9
SPACE	7	3	2.9	4.3
OTHER	8	6	5.9	8.6
NONE	9	7	6.9	10.0
	TOTAL RESPONSES	102	100.0	145.7

7 MISSING CASES 70 VALID CASES

8. **While you were deciding whether or not buy one, did you consider how a the home computer would affect your lifestyle?**

LIFSTYLE CONSIDERED HC AFFECTS LIFESTYLE

	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ FREQ (PERCENT)
NO	1	58	75.3	75.3	75.3
YES	2	19	24.7	24.7	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

HOWSTYLE HOW LIFESTYLE WOULD BE AFFECTED

	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ FREQ (PERCENT)
HOME OPERATIONS	1	7	9.1	33.3	33.3
PERSONAL GROWTH	2	3	3.9	14.3	47.6
HELP OFFICE-BUSINESS	3	5	6.5	23.8	71.4
LESS TIME W FAMILY	4	1	1.3	4.8	76.2
MORE TIME W COMPUTER	5	1	1.3	4.8	81.0
MONETARY	6	1	1.3	4.8	85.7
OTHERS	9	3	3.9	14.3	100.0
OUT OF RANGE		56	72.7	MISSING	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 21 MISSING CASES 56

9. **Before you purchased your home computer, how many people did you know who owned one?**

NUMOWNER # OF HC OWNERS KNOWN BEFORE PURCHASE

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
0.	20	26.0	26.0	26.0
1.	12	15.6	15.6	41.6
2.	13	16.9	16.9	58.4
3.	6	7.8	7.8	66.2
4.	1	1.3	1.3	67.5
5.	6	7.8	7.8	75.3
6.	5	6.5	6.5	81.8
8.	4	5.2	5.2	87.0
10.	3	3.9	3.9	90.9
12.	3	3.9	3.9	94.8
20.	1	1.3	1.3	96.1
25.	1	1.3	1.3	97.4
37.	1	1.3	1.3	98.7
50.	1	1.3	1.3	100.0
TOTAL	77	100.0	100.0	

MEAN 4.545 MEDIAN 2.000 STD DEV 7.910
VALID CASES 77 MISSING CASES 0

10. What positive results of using a home computer did they convey to you?

GROUP POSRES POSITIVE RESULTS BY OTHERS

	CODE	COUNT	PCT OF RESPONSES	PCT OF CASES
ENTERTAINMENT	1	19	25.7	36.5
TEXT PROCESSING	2	9	12.2	17.3
EDUCATION	3	9	12.2	17.3
SAVE TIME	4	5	6.8	9.6
HELP OFFICE WORK	5	9	12.2	17.3
HELP HOUSE WORK	7	6	8.1	11.5
BRAND QUALITIES	8	1	1.4	1.9
OTHER	9	16	21.6	30.8
	TOTAL RESPONSES	74	100.0	142.3

25 MISSING CASES 52 VALID CASES

11. What negative results?

GROUP NEGRES NEGATIVE RESULTS BY OTHERS

	CODE	COUNT	PCT OF RESPONSES	PCT OF CASES
BREAKDOWNS	1	6	16.2	21.4
SOFTWARE PROBLEMS	2	11	29.7	39.3
DIFFICULT TO USE	3	3	8.1	10.7
COST	4	5	13.5	17.9
CAN'T READ MANUAL	5	1	2.7	3.6
TECHNOLOGY OUTDATED	6	1	2.7	3.6
COMPUTER POWER	7	2	5.4	7.1
OTHERS	9	8	21.6	28.6
	TOTAL RESPONSES	37	100.0	132.1

49 MISSING CASES 28 VALID CASES

12. There are several ways in which people may get experience using a home computer before they buy one. For example, at work, at a friend's house, practicing at a computer store. Did you get a chance to use a home computer before you bought one?

GETEXPR CHANCE TO TRY HC BEFORE PURCHASE

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	1.	25	32.5	32.9	32.9
YES	2.	51	66.2	67.1	100.0
	-1.	1	1.3	MISSING	100.0
	TOTAL	77	100.0	100.0	

MEAN	1.671	MEDIAN	1.755	STD DEV	0.473
VALID CASES	76	MISSING CASES	1		

If YES, where did you use one? (CHECK ALL THAT APPLY)

GROUP EXPERIEN WHERE GOT EXPERIENCE

	NAME	COUNT	PCT OF RESPONSES	PCT OF CASES
TRIED HC AT WORK	EXPRWORK	20	25.0	37.7
TRIED HC AT FRIEND'S HOME	EXPRFRND	20	25.0	37.7
TRIED HC AT COMPUTER STORE	EXPRSTOR	23	28.8	43.4
TRIED HC SOMEWHERE ELSE	EXPROTHR	17	21.3	32.1
	TOTAL RESPONSES	80	100.0	150.9

24 MISSING CASES 53 VALID CASES

13. Where, or from whom, did you get information that influenced your decision to purchase a home computer? (CHECK ALL THAT APPLY)

GROUP INFLBUY INFLUENCES TO ADOPT HC

	NAME	COUNT	PCT OF RESPONSES	PCT OF CASES
DECISION INFLUENCED BY FRIEND	INFLFRND	34	16.5	45.9
DECISION INFLUENCED BY RELATIVE	INFLREL	6	2.9	8.1
DECISION INFLUENCED BY WORK ASSOCIATE	INFLCOL	27	13.1	36.5
DECISION INFLUENCED BY WORKPLACE	INFLWORK	16	7.8	21.6
DECISION INFLUENCED BY COMPUTER STORE	INFLSTOR	21	10.2	28.4
DECISION INFLUENCED BY NEWSPPR ARTICLES	INFLNEWS	17	8.3	23.0
DECISION INFLUENCED BY POP.MAG.ARTICLES	INFLMAG	13	6.3	17.6
DECISION INFLUENCED BY HOBBYMAG.ARTICLES	INFLHOB	20	9.7	27.0
DECISION INFLUENCED BY TV SHOWS	INFLTV	2	1.0	2.7
DECISION INFLUENCED BY NEWSPPR ADS	INFLNAD	9	4.4	12.2
DECISION INFLUENCED BY POP.MAG.ADS	INFLMAD	6	2.9	8.1
DECISION INFLUENCED BY HOBBY MAG ADS	INFLHAD	13	6.3	17.6
DECISION INFLUENCED BY TV ADS	INFLTVAD	2	1.0	2.7
DECISION INFLUENCED BY OTHER SOURCES	INFLOTHR	20	9.7	27.0
	TOTAL RESPONSES	206	100.0	278.4

3 MISSING CASES 74 VALID CASES

14. What was your main reason for buying a home computer?

WHYBUY MAIN REASON FOR PURCHASE

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NONE	0.	1	1.3	1.4	1.4
BUSINESS MAKE MONEY	1.	6	7.8	8.1	9.5
WORK AT HOME	2.	14	18.2	18.9	28.4
PART OF JOB	3.	8	10.4	10.8	39.2
FUN AND GAMES	4.	7	9.1	9.5	48.6
COMPUTER-REL LEARNIN	5.	4	5.2	5.4	54.1
SELF-EDUCATION	6.	6	7.8	8.1	62.2
CHILD-EDUCATION	7.	5	6.5	6.8	68.9
LINK TO COMPUTERS	8.	2	2.6	2.7	71.6
WORD-PROCESSING	9.	9	11.7	12.2	83.8
BOUGHT AS GOOD DEAL	10.	4	5.2	5.4	89.2
GIFT	11.	1	1.3	1.4	90.5
OTHER	12.	7	9.1	9.5	100.0
	-1.	3	3.9	MISSING	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 74 MISSING CASES 3

15. When did you buy your home computer?

YEARBUY YEAR HC BOUGHT

	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1975.	3	3.9	3.9	3.9
1977.	4	5.2	5.2	9.1
1978.	8	10.4	10.4	19.5
1979.	11	14.3	14.3	33.8
1980.	21	27.3	27.3	61.0
1981.	27	35.1	35.1	96.1
1982.	3	3.9	3.9	100.0
TOTAL	77	100.0	100.0	

MEAN	79.727	MEDIAN	80.095	STD DEV	1.570
VALID CASES	77	MISSING CASES	0		

MONTHBUY MONTH HC BOUGHT

	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
DON'T KNOW	7	9.1	9.1	9.1
JANUARY	6	7.8	7.8	16.9
FEBRUARY	4	5.2	5.2	22.1
MARCH	4	5.2	5.2	27.3
APRIL	1	1.3	1.3	28.6
MAY	6	7.8	7.8	36.4
JUNE	10	13.0	13.0	49.4
JULY	9	11.7	11.7	61.0
AUGUST	5	6.5	6.5	67.5
SEPTEMBER	5	6.5	6.5	74.0
OCTOBER	1	1.3	1.3	75.3
NOVEMBER	18	10.4	10.4	85.7
DECEMBER	11	14.3	14.3	100.0
TOTAL	77	100.0	100.0	

MEAN	6.468	MEDIAN	6.556	STD DEV	3.942
VALID CASES	77	MISSING CASES	0		

16. Was there any special event that triggered your decision to purchase a home computer?

TRIGGER TRIGGER EVENT TO PURCHASE DECISION

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	1.	35	45.5	45.5	45.5
YES	2.	42	54.5	54.5	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

IF YES, explain.

WHATTRIG WHAT THE TRIGGER EVENT WAS

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO ANSWER	0.	25	32.5	38.5	38.5
GOT MONEY	1.	8	10.4	12.3	50.8
JOB RELATED	2.	8	10.4	12.3	63.1
MAJOR PROJECT, THESI	3.	3	3.9	4.6	67.7
KIDS LOBBY	4.	1	1.3	1.5	69.2
SPECIAL DEAL	5.	7	9.1	10.8	80.0
GIFT	6.	6	7.8	9.2	89.2
OTHER	8.	7	9.1	10.8	100.0
	-1.	12	15.6	MISSING	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 65 MISSING CASES 12

17. **Where, or from whom, did you get information that influenced the brand of home computer you purchased? (CHECK ALL THAT APPLY)**

GROUP INFLBRND INFLUENCES TO BUY BRAND

	NAME	COUNT	PCT OF RESPONSES	PCT OF CASES
BRAND INFLUENCED BY FRIEND	BRNDFRND	32	18.4	43.2
BRAND INFLUENCED BY RELATIVE	BRNDREL	4	2.3	5.4
BRAND INFLUENCED BY WORK ASSOCIATE	BRNDCOL	21	12.1	28.4
BRAND INFLUENCED BY WORKPLACE	BRNDWORK	13	7.5	17.6
BRAND INFLUENCED BY COMPUTER STORE	BRNDSTOR	28	16.1	37.8
BRAND INFLUENCED BY NEWSPPR ARTICLES	BRNDNEWS	11	6.3	14.9
BRAND INFLUENCED BY POP MAG ARTICLES	BRNDMAG	10	5.7	13.5
BRAND INFLUENCED BY HOBBYMAG.ARTICLES	BRNDHOB	19	10.9	25.7
BRAND INFLUENCED BY NEWSPPR ADS	BRNDNAD	6	3.4	8.1
BRAND INFLUENCED BY POP.MAG.ADS	BRNDMAD	4	2.3	5.4
BRAND INFLUENCED BY HOBBY MAG ADS	BRNDHAD	8	4.6	10.8
BRAND INFLUENCED BY TV ADS	BRNDTVAD	2	1.1	2.7
BRAND INFLUENCED BY OTHER SOURCES	BRNDOTHR	16	9.2	21.6
TOTAL RESPONSES		174	100.0	235.1

3 MISSING CASES 74 VALID CASES

18. **What factors most influenced your decision as to what brand of home computer to buy? (CHECK ONES MENTIONED AND PROBE: "Any other major factor...?")**

GROUP ADVBRND ADVANTAGES TO BUY BRAND

	NAME	COUNT	PCT OF RESPONSES	PCT OF CASES
BRAND INFLUENCED BY COST	INFCOST	43	20.1	56.6
BRAND INFLUENCED BY SOFTWARE	INFSOFT	40	18.7	52.6
BRAND INFLUENCED BY PROGRAMABILITY	INFPROG	32	15.0	42.1
BRAND INFLUENCED EXPANDBLTY. OF PERIFS.	INFPER	28	13.1	36.8
BRAND INFLUENCED BY SIZE-REP. OF MNFC.	INFSIZE	27	12.6	35.5
BRAND INFLUENCED BY ABILTY TO INTERFACE	INFIFACE	8	3.7	10.5
BRAND INFLUENCED ABLTY. LINK FRIENDS	INFLINK	8	3.7	10.5
BRAND INFLUENCED BY OTHER FACTORS	INFOTHR	28	13.1	36.8
TOTAL RESPONSES		214	100.0	281.6

1 MISSING CASES 76 VALID CASES

19. **How many sellers of home computers did you contact before you purchased your home computer? __**

NUMSTORE # OF SELLERS CONTACTED BEFORE PURCHASE

	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
0.	16	20.8	21.3	21.3
1.	14	18.2	18.7	40.0
2.	11	14.3	14.7	54.7
3.	14	18.2	18.7	73.3
4.	8	10.4	10.7	84.0
5.	6	7.8	8.0	92.0
6.	4	5.2	5.3	97.3
7.	2	2.6	2.7	100.0
-1.	2	2.6	MISSING	100.0
TOTAL	77	100.0	100.0	

MEAN	2.373	MEDIAN	2.182	STD DEV	1.951
VALID CASES	75	MISSING CASES	2		

20. **Where did you purchase your home computer?**

WHEREBUY WHERE HC PURCHASED

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
COMPUTER STORE	1.	36	46.8	46.8	46.8
ELECTRONICS STORE	2.	6	7.8	7.8	54.5
MANUFACTURER'S STORE	3.	12	15.6	15.6	70.1
DIRECT MAIL	4.	8	10.4	10.4	80.5
ANOTHER INDIVIDUAL	5.	5	6.5	6.5	87.0
OTHER	6.	8	10.4	10.4	97.4
COMPUTER FAIR	7.	1	1.3	1.3	98.7
DEPARTMENT STORE	8.	1	1.3	1.3	100.0
TOTAL		77	100.0	100.0	

VALID CASES	77	MISSING CASES	0

21. **Why did you buy it from there? (CHECK ALL THAT APPLY)**

GROUP WHYTHERE WHY PURCHASED FROM THERE

	NAME	COUNT	PCT OF RESPONSES	PCT OF CASES
SALESPERSON	PLCCLERK	8	7.5	10.5
FRIEND'S RECOMMENDATN	PLCFRND	10	9.4	13.2
DESIRED PRODTS CARRIED	PLCPROD	25	23.6	32.9
LOWEST PRICE	PLCPRICE	36	34.0	47.4
MOST HELP IN LEARNING	PLCLERN	4	3.8	5.3
OTHER REASONS	PLCOTHR	23	21.7	30.3
TOTAL RESPONSES		106	100.0	139.5

1 MISSING CASES 76 VALID CASES

22. What brand did you buy?

GROUP BRNDBUY BRANDS PURCHASED

	CODE	COUNT	PCT OF RESPONSES	PCT OF CASES
APPLE	1	38	43.2	49.4
RADIO SHACK	2	13	14.8	16.9
ATARI	3	6	6.8	7.8
IBM	4	4	4.5	5.2
HEWLETT PACKARD	5	2	2.3	2.6
COMMODORE PET	6	6	6.8	7.8
OSBORNE	10	2	2.3	2.6
OTHER-UNSPECIFIED	12	17	19.3	22.1
	TOTAL RESPONSES	88	100.0	114.3

0 MISSING CASES 77 VALID CASES

23. Approximately how much have you spent for your computer, including peripherals? $_____

PRICE AMOUNT SPENT ON HC INC. PERIPHERALS

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NONE	0.	2	2.6	2.7	2.7
UNDER $1000	1.	10	13.0	13.7	16.4
$1000-2000	2.	10	13.0	13.7	30.1
$2000-3000	3.	19	24.7	26.0	56.2
$3001-4000	4.	9	11.7	12.3	68.5
$4001-5000	5.	9	11.7	12.3	80.8
$5001-6000	6.	4	5.2	5.5	86.3
$6001-7000	7.	4	5.2	5.5	91.8
OVER $7000	8.	6	7.8	8.2	100.0
	-1.	4	5.2	MISSING	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 73 MISSING CASES 4

MEAN 3733.792 STD ERROR 473.865 STD DEV 4158.15

24. What peripheral equipment have you bought in addition to the computer?

BUYPER HAVE BOUGHT PERIPHERALS

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
YES, BOUGHT SOME	0.	65	84.4	85.5	85.5
NO, NONE BOUGHT	1.	11	14.3	14.5	100.0
	-1.	1	1.3	MISSING	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 76 MISSING CASES 1

GROUP PERIPH PERIPHERALS OWNED NOW

	NAME	COUNT	PCT OF RESPONSES	PCT OF CASES
PRINTER ADDED ON	PRINTER	45	30.0	67.2
DISC DRIVE ADDED ON	DISKDRIV	43	28.7	64.2
MODEM ADDED ON	MODEM	29	19.3	43.3
OTHER PERIPHERALS ADDED ON	OTHRPER	33	22.0	49.3
TOTAL RESPONSES		150	100.0	223.9

10 MISSING CASES 67 VALID CASES

What Brands?

PRINTER PRINTER ADDED ON

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NONE	0.	32	41.6	41.6	41.6
APPLE	1.	12	15.6	15.6	57.1
RADIO SHACK	2.	4	5.2	5.2	62.3
ATARI	3.	2	2.6	2.6	64.9
IBM	4.	3	3.9	3.9	68.8
HEWLETT PACKARD	5.	2	2.6	2.6	71.4
OTHER-UNSPECIFIED	12.	22	28.6	28.6	100.0
TOTAL		77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

DISKDRIV DISC DRIVE ADDED ON

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NONE	0.	34	44.2	44.2	44.2
APPLE	1.	21	27.3	27.3	71.4
RADIO SHACK	2.	6	7.8	7.8	79.2
ATARI	3.	3	3.9	3.9	83.1
HEWLETT PACKARD	5.	2	2.6	2.6	85.7
XEROX	7.	1	1.3	1.3	87.0
OTHER-UNSPECIFIED	12.	10	13.0	13.0	100.0
TOTAL		77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

MODEM MODEM ADDED ON

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NONE	0.	48	62.3	62.3	62.3
APPLE	1.	3	3.9	3.9	66.2
RADIO SHACK	2.	3	3.9	3.9	70.1
IBM	4.	2	2.6	2.6	72.7
HEWLETT PACKARD	5.	2	2.6	2.6	75.3
OTHER-UNSPECIFIED	12.	19	24.7	24.7	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

OTHRPER OTHER PERIPHERALS ADDED ON

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NONE	0.	44	57.1	57.1	57.1
APPLE	1.	7	9.1	9.1	66.2
ATARI	3.	3	3.9	3.9	70.1
HEWLETT PACKARD	5.	1	1.3	1.3	71.4
NEC	8.	1	1.3	1.3	72.7
OSBORNE	10.	1	1.3	1.3	74.0
OTHER-UNSPECIFIED	12.	20	26.0	26.0	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

GROUP ORIGPER PERIPHERALS ORIG. BOUGHT

	CODE	COUNT	PCT OF RESPONSES	PCT OF CASES
NONE	0	184	67.4	242.1
PRINTER	2	26	9.5	34.2
DISC DRIVE	3	31	11.4	40.8
MODEM	4	15	5.5	19.7
OTHER	5	17	6.2	22.4
	TOTAL RESPONSES	273	100.0	359.2

1 MISSING CASES 76 VALID CASES

26. Did you buy a service plan?

SERVPLAN BOUGHT SERVICE PLAN

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	1.	68	88.3	88.3	88.3
YES	2.	9	11.7	11.7	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

27. **How many days or weeks did it take you to feel comfortable using your home computer?**

COMFORT # OF DAYS TO FEEL COMFORTABLE USING HC

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	0.	8	10.4	11.1	11.1
	1.	7	9.1	9.7	20.8
	2.	4	5.2	5.6	26.4
	3.	1	1.3	1.4	27.8
	4.	2	2.6	2.8	30.6
	5.	4	5.2	5.6	36.1
	7.	10	13.0	13.9	50.0
	10.	2	2.6	2.8	52.8
	14.	7	9.1	9.7	62.5
	17.	1	1.3	1.4	63.9
	21.	4	5.2	5.6	69.4
	28.	2	2.6	2.8	72.2
	30.	1	1.3	1.4	73.6
	31.	1	1.3	1.4	75.0
	42.	1	1.3	1.4	76.4
	56.	2	2.6	2.8	79.2
	60.	1	1.3	1.4	80.6
	61.	1	1.3	1.4	81.9
	64.	1	1.3	1.4	83.3
	70.	1	1.3	1.4	84.7
	120.	1	1.3	1.4	86.1
	150.	1	1.3	1.4	87.5
	168.	1	1.3	1.4	88.9
	182.	1	1.3	1.4	90.3
	240.	1	1.3	1.4	91.7
	365.	2	2.6	2.8	94.4
NOT YET COMFORTABLE	999.	4	5.2	5.6	100.0
	-1.	5	6.5	MISSING	100.0
	TOTAL	77	100.0	100.0	

MEAN	89.486	MEDIAN	7.500	STD DEV	233.220
VALID CASES	72	MISSING CASES	5		

28. **On a scale of 1 to 7 (seven being extremely satisfied), how satisfied are you with your home computer?**

SATISFTN DEGREE OF SATISFACTION WITH HC

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
VERY DISSATISFIED	1.	1	1.3	1.3	1.3
	2.	1	1.3	1.3	2.6
	3.	5	6.5	6.5	9.1
	4.	4	5.2	5.2	14.3
	5.	13	16.9	16.9	31.2
	6.	23	29.9	29.9	61.0
VERY SATISFIED	7.	30	39.0	39.0	100.0
	TOTAL	77	100.0	100.0	

MEAN	5.805	MEDIAN	6.130	STD DEV	1.367
VALID CASES	77	MISSING CASES	0		

29. Did you encounter any problems using your home computer?

ANYPROB ENCOUNTERED ANY PROBLEMS IN USING HC

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	1.	29	37.7	37.7	37.7
YES	2.	48	62.3	62.3	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

GROUP SEVRPROB SEVERE PROBS. WITH HC

	NAME	COUNT	PCT OF RESPONSES	PCT OF CASES
DIFFICULTIES LEARNING TO USE SYSTEM	HARDLERN	6	14.3	22.2
BREAKDOWNS	BREAKDWN	11	26.2	40.7
LACK OF USEFUL PROGRAMS	NOPROGS	7	16.7	25.9
PROBLEMS IN PROGRAMS	PROGBUGS	5	11.9	18.5
BAD DOCUMENTATION	BADDOC	13	31.0	48.1
	TOTAL RESPONSES	42	100.0	155.6

50 MISSING CASES 27 VALID CASES

GROUP MINRPROB MINOR PROBS. WITH HC

	NAME	COUNT	PCT OF RESPONSES	PCT OF CASES
DIFFICULTIES LEARNING TO USE SYSTEM	HARDLERN	11	34.4	45.8
BREAKDOWNS	BREAKDWN	8	25.0	33.3
LACK OF USEFUL PROGRAMS	NOPROGS	1	3.1	4.2
PROBLEMS IN PROGRAMS	PROGBUGS	7	21.9	29.2
BAD DOCUMENTATION	BADDOC	5	15.6	20.8
	TOTAL RESPONSES	32	100.0	133.3

53 MISSING CASES 24 VALID CASES

OTHRPROB OTHER PROBLEMS

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO OTHER PROBLEMS	0.	61	79.2	80.3	80.3
OTHER-UNSPECIFIED	1.	2	2.6	2.6	82.9
INTERFACING-OTHER HC	2.	1	1.3	1.3	84.2
PERIPHERALS	3.	2	2.6	2.6	86.8
EXTRA MEMORY	4.	1	1.3	1.3	88.2
JOY STICKS BREAK	5.	1	1.3	1.3	89.5
HARDWARE PROBLEMS	6.	6	7.8	7.9	97.4
DEVELOPMENT PROBLEMS	7.	1	1.3	1.3	98.7
NOT ENOUGH KEYS	8.	1	1.3	1.3	100.0
	-1.	1	1.3	MISSING	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 76 MISSING CASES 1

30. **Approximately how many hours per week is your home computer used for the following purposes:**

GROUP USES TYPES OF USES FOR HC

	NAME	COUNT	PCT OF RESPONSES	PCT OF CASES
USAGE OF HC FOR ENTERTAINMENT	ENTRMNT	51	20.2	69.9
USAGE OF HC FOR PERS. WORD PROCESSING	WORDPROC	40	15.9	54.8
USAGE OF HC FOR WORK WORD PROCESSING	WORKREL	37	14.7	50.7
USAGE OF HC FOR HOME BUDGETING	HOMBUDG	23	9.1	31.5
USAGE OF HC FOR CHILD.LEARNING AID	LERNAID1	18	7.1	24.7
USAGE OF HC FOR SELF LEARNING AID	LERNAID2	24	9.5	32.9
USAGE OF HC FOR BUSINESS MANAGEMENT	BUSMGT	29	11.5	39.7
USAGE OF HC FOR DATABASE ACCESS	DATACES	30	11.9	41.1
	TOTAL RESPONSES	252	100.0	345.2

4 MISSING CASES 73 VALID CASES

31. **Do you use your home computer for home monitoring (alarms, temperature control etc.)?**

TEMPCNTL HC DEVOTED TO HOME MONITORING

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	1.	73	94.8	94.8	94.8
YES	2.	4	5.2	5.2	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

32. **Do you ever link up, by phone, to any large timesharing or database computer system such as the SOURCE, COMPUSERVE, DIALOG, or a University computer network?**

USELINK USELINK TO LARGE COMPUTER SYSTEM

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	1.	42	54.5	54.5	54.5
YES	2.	35	45.5	45.5	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

If Yes, which ones?

GROUP LINK LINKS USED BY HC USERS

	CODE	COUNT	PCT OF RESPONSES	PCT OF CASES
LOTS	1	9	19.1	28.1
HP3000 AT WORK	2	1	2.1	3.1
DIALOG	3	2	4.3	6.3
STANFORD U. CIT	4	8	17.0	25.0
SOURCE	5	6	12.8	18.8
COMPUSERVE	6	5	10.6	15.6
CONFERENCING	7	1	2.1	3.1
ARPANET	8	2	4.3	6.3
STANFORD U. CONTEXT	9	2	4.3	6.3
DOW JONES STOCK MARK	11	2	4.3	6.3
PUBL. BULL. BOARDS	15	1	2.1	3.1
TYMSHARE	16	1	2.1	3.1
STANFORD U. BUS. SCH	17	1	2.1	3.1
IBM EMPLOYEE LINK	18	1	2.1	3.1
STANFORD OTHER	19	3	6.4	9.4
OTHER	99	2	4.3	6.3
	TOTAL RESPONSES	47	100.0	146.9

45 MISSING CASES 32 VALID CASES

What programs do you access?

LINKPROG WHAT PROGRAMS ACCESSED

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO PROGRAMS	0.	46	59.7	74.2	74.2
OWN COMPUTER PROGRAM	1.	2	2.6	3.2	77.4
WORK-RELATED PROGRAM	2.	1	1.3	1.6	79.0
WILL NOT IDENTIFY	3.	2	2.6	3.2	82.3
ELECTRONIC MAIL	4.	2	2.6	3.2	85.5
DATA BASE	5.	1	1.3	1.6	87.1
SPSS	6.	2	2.6	3.2	90.3
FILE TRANSFER	7.	1	1.3	1.6	91.9
SALES,MANUF,BUSINESS	8.	1	1.3	1.6	93.5
LOTS FILES	9.	1	1.3	1.6	95.2
COMPUTER LANGUAGES	10.	1	1.3	1.6	96.8
GAMES	11.	1	1.3	1.6	98.4
OTHER	99.	1	1.3	1.6	100.0
	-1.	15	19.5	MISSING	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 62 MISSING CASES 15

What information do you access? _____

LINKINFO WHAT INFORMATION ACCESSED

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO INFO ACCESSED	0.	43	55.8	69.4	69.4
MEDICAL INFORMATION	1.	1	1.3	1.6	71.0
MEDICAL TEACHING	2.	2	2.6	3.2	74.2
NEWSPAPER	3.	4	5.2	6.5	80.6
BULLETIN BOARD	4.	3	3.9	4.8	85.5
BIBLIOGRAPHY SEARCH	5.	1	1.3	1.6	87.1
PERSONAL FILES	6.	1	1.3	1.6	88.7
ENGINEERING DOCUMENT	7.	1	1.3	1.6	90.3
SALES,MANUF,BUSINESS	8.	1	1.3	1.6	91.9
DATA BASE FILES	9.	2	2.6	3.2	95.2
GAMES	10.	1	1.3	1.6	96.8
STOCK	11.	2	2.6	3.2	100.0
	-1.	15	19.5	MISSING	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 62 MISSING CASES 15

33. After you purchased your home computer, did you discover any uses for it which you hadn't thought of before buying?

NEWUSES DISCOVERED NEW USES AFTER PURCHASE

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	1.	47	61.0	61.0	61.0
YES	2.	30	39.0	39.0	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

If Yes, then what were they?

GROUP NEWUSE NEW USES FOUND BY USERS

	CODE	COUNT	PCT OF RESPONSES	PCT OF CASES
WORD PROCESSING	1	10	26.3	35.7
GAMES	2	2	5.3	7.1
STAMP COLLECTING	3	1	2.6	3.6
INCOME TAX	4	1	2.6	3.6
HOME SURVEILLANCE	5	2	5.3	7.1
COMPUTER ART	6	7	18.4	25.0
KIDS LEARNING AID	7	2	5.3	7.1
INVENTORY CONTROL	8	1	2.6	3.6
FILE ORGANIZATION	9	1	2.6	3.6
DATA BASE SERVICES	10	3	7.9	10.7
MUSIC PLAYING	11	2	5.3	7.1
PEER COUNSELING	12	1	2.6	3.6
LINK LARGE COMPUTER	13	1	2.6	3.6
OTHER PROGRAMS	14	1	2.6	3.6
HOME BUDGETING	15	1	2.6	3.6
BUSINESS	16	2	5.3	7.1
	TOTAL RESPONSES	38	100.0	135.7

49 MISSING CASES 28 VALID CASES

34. Which members of your family use the home computer?

GROUP USERS PEOPLE WHO USE HC

	NAME	COUNT	PCT OF RESPONSES	PCT OF CASES
SPOUSE USES HC	SPOUSE	25	35.2	54.3
CHILDREN UNDER 12 USE HC	UNDER12	16	22.5	34.8
OLDER CHILDREN USE HC	OLDERKID	27	38.0	58.7
RELATIVE USES HC	RELATIVE	3	4.2	6.5
	TOTAL RESPONSES	71	100.0	154.3

31 MISSING CASES 46 VALID CASES

PROMPT: For what purpose, primarily?

SPOUSE SPOUSE USES HC

	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ FREQ (PERCENT)
ENTERTAINMENT	1	4	5.2	16.0	16.0
PERS WORD PROCESSING	2	5	6.5	20.0	36.0
WORK WORD PROCESSING	3	5	6.5	20.0	56.0
HOME BUDGETING	4	4	5.2	16.0	72.0
KIDS LEARNING AID	5	1	1.3	4.0	76.0
OWN LEARNING AID	6	1	1.3	4.0	80.0
BUSINESS MGMT.	7	5	6.5	20.0	100.0
OUT OF RANGE		52	67.5	MISSING	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 25 MISSING CASES 52

UNDER12 CHILDREN UNDER 12 USE HC

	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ FREQ (PERCENT)
ENTERTAINMENT	1	14	18.2	87.5	87.5
KIDS LEARNING AID	5	2	2.6	12.5	100.0
OUT OF RANGE		61	79.2	MISSING	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 16 MISSING CASES 61

OLDERKID OLDER CHILDREN USE HC

	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ FREQ (PERCENT)
ENTERTAINMENT	1	18	23.4	66.7	66.7
PERS WORD PROCESSING	2	2	2.6	7.4	74.1
WORK WORD PROCESSING	3	2	2.6	7.4	81.5
KIDS LEARNING AID	5	3	3.9	11.1	92.6
OWN LEARNING AID	6	1	1.3	3.7	96.3
PROGRAMMING	9	1	1.3	3.7	100.0
OUT OF RANGE		50	64.9	MISSING	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 27 MISSING CASES 50

RELATIVE RELATIVE USES HC

	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ FREQ (PERCENT)
ENTERTAINMENT	1	3	3.9	100.0	100.0
OUT OF RANGE		74	96.1	MISSING	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 3 MISSING CASES 74

35. Where in the house do you keep your home computer?

WHERKEEP LOCATION OF HC IN HOUSE

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
STUDY	1.	19	24.7	24.7	24.7
LIVING ROOM	2.	12	15.6	15.6	40.3
BEDROOM	3.	20	26.0	26.0	66.2
FAMILY ROOM	4.	7	9.1	9.1	75.3
KITCHEN,DINING ROOM	5.	2	2.6	2.6	77.9
DEN	6.	8	10.4	10.4	88.3
OTHER	7.	9	11.7	11.7	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

36. Have you found your home computer to be a money-saving device?

SAVEMONY FOUND HC TO BE MONEY SAVING DEVICE

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	1.	50	64.9	64.9	64.9
YES	2.	27	35.1	35.1	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

IF YES, how has it saved you money?

GROUP MONYSAVE WAYS IN WHICH HC SAVES MONEY
(VALUE TABULATED = 1)

	NAME	COUNT	PCT OF RESPONSES	PCT OF CASES
SAVED MONEY ON BUDGET PLANNING	BUDGSAVE	12	31.6	42.9
SAVED MONEY ON SHOPPING	SHOPSAVE	2	5.3	7.1
SAVED MONEY ON ENERGY	ENERGYSV	1	2.6	3.6
SAVED MONEY ON ENTERTAINMENT	ENTRTNSV	12	31.6	42.9
HC SAVED MONEY IN OTHER WAYS	OTHRSAVE	11	28.9	39.3
TOTAL RESPONSES		38	100.0	135.7

49 MISSING CASES 28 VALID CASES

OTHRSAVE HC SAVED MONEY IN OTHER WAYS

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
DIDN'T SAVE MONEY	0.	53	68.8	82.8	82.8
OTHER-UNSPECIFIED	1.	7	9.1	10.9	93.8
MONEY MAKING	2.	3	3.9	4.7	98.4
BUSINESS, COST AWARE	4.	1	1.3	1.6	100.0
	-1.	13	16.9	MISSING	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 64 MISSING CASES 13

37. **Have you found your home computer to be a time-saving device?**

SAVETIME FOUND HC TO BE TIME SAVING DEVICE

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	1.	22	28.6	28.6	28.6
YES	2.	55	71.4	71.4	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

IF YES, how has it saved you time?

GROUP TIMSAVE WAYS IN WHICH HC SAVE TIME

	CODE	COUNT	PCT OF RESPONSES	PCT OF CASES
TERMINAL LINK	1	1	1.6	2.0
PROCESSING INVOICES	2	7	10.9	13.7
CORRESPONDENCES	3	3	4.7	5.9
WORD PROCESSING	4	20	31.3	39.2
DON'T GO TO OFFICE	5	8	12.5	15.7
DATA PROCESSING	6	3	4.7	5.9
DATA BASE SEARCHING	7	2	3.1	3.9
TAXES	8	2	3.1	3.9
SHOPPING	9	1	1.6	2.0
HOUSE BILLS, BUDGET	10	4	6.3	7.8
PROBLEM SOLVING	11	7	10.9	13.7
DON'T KNOW	12	5	7.8	9.8
INFO RETRIEVAL	13	1	1.6	2.0
	TOTAL RESPONSES	64	100.0	125.5

26 MISSING CASES 51 VALID CASES

38. **Since you bought your home computer, has your use increased, decreased, or stayed the same as when you first bought it?**

USECHANG HC USAGE INCREASED SINCE PURCHASE

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
INCREASED	1.	43	55.8	55.8	55.8
THE SAME	2.	22	28.6	28.6	84.4
DECREASED	3.	11	14.3	14.3	98.7
DON'T KNOW	4.	1	1.3	1.3	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

39. **Do you plan to sell your home computer in the near future?**

WANTSELL PLAN TO SELL HC SOON

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
WILL SELL, WON'T BUY	1.	3	3.9	3.9	3.9
DON'T INTEND TO SELL	2.	65	84.4	84.4	88.3
WILL SELL, WILL BUY	3.	9	11.7	11.7	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

If so, what brand do you intend to buy?

NEWBUY NEW BRAND PLAN TO BUY

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO BRAND	0.	55	71.4	84.6	84.6
APPLE	1.	1	1.3	1.5	86.2
RADIO SHACK	2.	2	2.6	3.1	89.2
IBM	4.	2	2.6	3.1	92.3
HEWLETT PACKARD	5.	1	1.3	1.5	93.8
OTHER-UNSPECIFIED	12.	4	5.2	6.2	100.0
	-1.	12	15.6	MISSING	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 65 MISSING CASES 12

40. **Would you say that your total amount of TV viewing has increased, or decreased, since you bought your home computer?**

TVCHANGE TV VIEWING INCREASED SINCE PURCHASE

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
DECREASED, 1 HOUR	11.	18	23.4	23.4	23.4
DECREASED, 2 HOURS	12.	10	13.0	13.0	36.4
DECREASED, 3 HOURS	13.	2	2.6	2.6	39.0
DECREASED, 4 HOURS	14.	1	1.3	1.3	40.3
NO CHANGE	20.	43	55.8	55.8	96.1
INCREASED, 1 HOUR	31.	2	2.6	2.6	98.7
INCREASED, 3 HOURS	33.	1	1.3	1.3	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

41. **Have you talked to other people about your home computer? (ASIDE FROM OTHER HOUSEHOLD MEMBERS)**

PEOPTALK # OF PEOPLE TALKED TO ABOUT OWN HC

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
0.	11	14.3	14.5	14.5
1.	1	1.3	1.3	15.8
2.	6	7.8	7.9	23.7
3.	8	10.4	10.5	34.2
4.	5	6.5	6.6	40.8
5.	9	11.7	11.8	52.6
6.	1	1.3	1.3	53.9
7.	1	1.3	1.3	55.3
10.	11	14.3	14.5	69.7
11.	2	2.6	2.6	72.4
12.	1	1.3	1.3	73.7
15.	1	1.3	1.3	75.0
17.	1	1.3	1.3	76.3
20.	9	11.7	11.8	88.2
25.	2	2.6	2.6	90.8
30.	3	3.9	3.9	94.7
50.	1	1.3	1.3	96.1
98.	2	2.6	2.6	98.7
99.	1	1.3	1.3	100.0
-1.	1	1.3	MISSING	100.0
TOTAL	77	100.0	100.0	

MEAN	12.579	MEDIAN	5.278	STD DEV	19.840
VALID CASES	76	MISSING CASES	1		

42. Do you show people your computer when they visit your home?

PEOPSHOW # OF PEOPLE SHOWN OWN HC TO

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
0.	26	33.8	33.8	33.8
1.	4	5.2	5.2	39.0
2.	11	14.3	14.3	53.2
3.	5	6.5	6.5	59.7
4.	6	7.8	7.8	67.5
5.	11	14.3	14.3	81.8
6.	1	1.3	1.3	83.1
8.	1	1.3	1.3	84.4
10.	6	7.8	7.8	92.2
12.	1	1.3	1.3	93.5
15.	3	3.9	3.9	97.4
20.	1	1.3	1.3	98.7
99.	1	1.3	1.3	100.0
TOTAL	77	100.0	100.0	

MEAN	4.805	MEDIAN	2.273	STD DEV	11.701
VALID CASES	77	MISSING CASES	0		

43. Have you encouraged any other person to buy a home computer?

PEOPCOAX # OF PEOPLE YOU ENCOURAGED TO BUY HC

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
0.	23	29.9	30.3	30.3
1.	4	5.2	5.3	35.5
2.	6	7.8	7.9	43.4
3.	7	9.1	9.2	52.6
4.	5	6.5	6.6	59.2
5.	8	10.4	10.5	69.7
6.	3	3.9	3.9	73.7
9.	1	1.3	1.3	75.0
10.	6	7.8	7.9	82.9
11.	1	1.3	1.3	84.2
12.	2	2.6	2.6	86.8
15.	1	1.3	1.3	88.2
20.	2	2.6	2.6	90.8
22.	1	1.3	1.3	92.1
24.	1	1.3	1.3	93.4
28.	1	1.3	1.3	94.7
30.	1	1.3	1.3	96.1
50.	1	1.3	1.3	97.4
98.	1	1.3	1.3	98.7
99.	1	1.3	1.3	100.0
-1.	1	1.3	MISSING	100.0
TOTAL	77	100.0	100.0	

MEAN	8.224	MEDIAN	3.214	STD DEV	17.167
VALID CASES	76	MISSING CASES	1		

44. If you need help in the operation of your home computer, to whom do you go for help?

GROUP HELP SOURCES OF HELP

	NAME	COUNT	PCT OF RESPONSES	PCT OF CASES
GET HELP FROM SELLER	HELPSELL	19	32.2	41.3
GET HELP FROM FRIEND	HELPFRND	21	35.6	45.7
GET HELP FROM COLLEAGUE, WORK ASSOCIATE	HELPCOL	3	5.1	6.5
GET HELP FROM MANUAL	HELPMANL	16	27.1	34.8
TOTAL RESPONSES		59	100.0	128.3

31 MISSING CASES 46 VALID CASES

45. Do you belong to a home computer club?

CLUBMEM MEMBER OF COMPUTER CLUB

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	1.	52	67.5	67.5	67.5
YES	2.	25	32.5	32.5	100.0
TOTAL		77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

IF YES, which one? _____

GROUP WATCLUB CLUBS USERS BELONG TO

	CODE	COUNT	PCT OF RESPONSES	PCT OF CASES
COMPUCOLOR USERS GRP	2	1	3.1	4.0
SU MICROCOMP USERS G	4	11	34.4	44.0
HOME BREW	5	2	6.3	8.0
APPLE USERS	6	5	15.6	20.0
OWNER ASSOC	7	1	3.1	4.0
OTHERS	9	12	37.5	48.0
TOTAL RESPONSES		32	100.0	128.0

52 MISSING CASES 25 VALID CASES

46. Now we would like to ask your opinion on the role of computers in society. Please indicate your whether you agree, disagree, strongly agree or strongly disagree with each of these statements. (DK= DON'T KNOW OR NO OPINION)

Computers will replace interaction with other people.

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
STRONGLY DISAGREE	1.	41	53.2	53.2	53.2
MODERATELY DISAGREE	2.	22	28.6	28.6	81.8
DON'T KNOW	3.	1	1.3	1.3	83.1
MODERATELY AGREE	4.	9	11.7	11.7	94.8
STRONGLY AGREE	5.	4	5.2	5.2	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

Computers are too complicated for most people to ever understand.

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
STRONGLY DISAGREE	1.	33	42.9	42.9	42.9
MODERATELY DISAGREE	2.	22	28.6	28.6	71.4
DON'T KNOW	3.	3	3.9	3.9	75.3
MODERATELY AGREE	4.	16	20.8	20.8	96.1
STRONGLY AGREE	5.	3	3.9	3.9	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

The development of technology will provide solutions for most of the problems of the world.

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
STRONGLY DISAGREE	1.	24	31.2	31.2	31.2
MODERATELY DISAGREE	2.	25	32.5	32.5	63.6
DON'T KNOW	3.	6	7.8	7.8	71.4
MODERATELY AGREE	4.	18	23.4	23.4	94.8
STRONGLY AGREE	5.	4	5.2	5.2	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

Computers should not be used to play games.

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
STRONGLY DISAGREE	1.	45	58.4	58.4	58.4
MODERATELY DISAGREE	2.	24	31.2	31.2	89.6
DON'T KNOW	3.	4	5.2	5.2	94.8
MODERATELY AGREE	4.	3	3.9	3.9	98.7
STRONGLY AGREE	5.	1	1.3	1.3	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

Home computers will enhance family life.

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
STRONGLY DISAGREE	1.	5	6.5	6.5	6.5
MODERATELY DISAGREE	2.	13	16.9	16.9	23.4
DON'T KNOW	3.	21	27.3	27.3	50.6
MODERATELY AGREE	4.	31	40.3	40.3	90.9
STRONGLY AGREE	5.	7	9.1	9.1	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

Computers will replace newspapers and magazines as we know them today.

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
STRONGLY DISAGREE	1.	11	14.3	14.3	14.3
MODERATELY DISAGREE	2.	18	23.4	23.4	37.7
DON'T KNOW	3.	5	6.5	6.5	44.2
MODERATELY AGREE	4.	29	37.7	37.7	81.8
STRONGLY AGREE	5.	14	18.2	18.2	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

Computers threaten to destroy individual privacy.

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
STRONGLY DISAGREE	1.	18	23.4	23.4	23.4
MODERATELY DISAGREE	2.	25	32.5	32.5	55.8
DON'T KNOW	3.	7	9.1	9.1	64.9
MODERATELY AGREE	4.	22	28.6	28.6	93.5
STRONGLY AGREE	5.	5	6.5	6.5	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

47. Do you read any computer journals?

JOURNLS READ COMPUTER JOURNALS

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	1.	23	29.9	29.9	29.9
YES	2.	54	70.1	70.1	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

IF YES, which ones? _____

GROUP JTITLE JOURNALS USERS READ

	CODE	COUNT	PCT OF RESPONSES	PCT OF CASES
BYTE	1	36	25.4	69.2
INFO WORLD	2	13	9.2	25.0
80 US	3	3	2.1	5.8
PERSONAL COMPUTING	4	5	3.5	9.6
COMPUTER WORLD	5	5	3.5	9.6
CREATIVE COMPUTING	6	10	7.0	19.2
DATA MATION	7	1	0.7	1.9
MICROAGE	8	1	0.7	1.9
OTHERS	9	68	47.9	130.8
	TOTAL RESPONSES	142	100.0	273.1

25 MISSING CASES 52 VALID CASES

48. Do you own any of these products? If so, in what year did you first purchase it?

GROUP OTHRTECH OTHER DEVICES OWNED

	NAME	COUNT	PCT OF RESPONSES	PCT OF CASES
WHEN PURCHASED SONY WALKMAN	WALKMAN	20	8.7	27.4
WHEN PURCHASED FOOD PROCESSOR	FOODPROC	30	13.0	41.1
WHEN PURCHASED PROG. CALCULATOR	PROGCALC	43	18.7	58.9
WHEN PURCHASED VIDEO CASSETTE RECORDER	VCR	13	5.7	17.8
WHEN PURCHASED DIGITAL WATCH	DIGWATCH	56	24.3	76.7
WHEN PURCHASED VIDEO GAMES	VIDEOGAM	27	11.7	37.0
WHEN PURCHASED MICORWAVE OVEN	MICROWAV	31	13.5	42.5
WHEN PURCHASED SOLAR PANELS	SOLAR	10	4.3	13.7
	TOTAL RESPONSES	230	100.0	315.1

4 MISSING CASES 73 VALID CASES

WALKMAN WHEN PURCHASED SONY WALKMAN

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
DON'T OWN	0.	57	74.0	74.0	74.0
	1980.	1	1.3	1.3	75.3
	1911.	15	19.5	19.5	94.8
	1982.	4	5.2	5.2	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

FOODPROC WHEN PURCHASED FOOD PROCESSOR

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
DON'T OWN	0.	47	61.0	61.0	61.0
	1965.	1	1.3	1.3	62.3
	1975.	3	3.9	3.9	66.2
	1976.	1	1.3	1.3	67.5
	1977.	3	3.9	3.9	71.4
	1978.	8	10.4	10.4	81.8
	1979.	5	6.5	6.5	88.3
	1980.	3	3.9	3.9	92.2
	1981.	4	5.2	5.2	97.4
	1982.	2	2.6	2.6	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

PROGCALC WHEN PURCHASED PROG. CALCULATOR

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
DON'T OWN	0.	34	44.2	44.2	44.2
	1970.	1	1.3	1.3	45.5
	1971.	1	1.3	1.3	46.8
	1974.	2	2.6	2.6	49.4
	1975.	6	7.8	7.8	57.1
	1976.	6	7.8	7.8	64.9
	1977.	6	7.8	7.8	72.7
	1978.	4	5.2	5.2	77.9
	1979.	10	13.0	13.0	90.9
	1980.	4	5.2	5.2	96.1
	1981.	3	3.9	3.9	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

VCR WHEN PURCHASED VIDEO CASSETTE RECORDER

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
DON'T OWN	0.	64	83.1	83.1	83.1
	1976.	1	1.3	1.3	84.4
	1977.	1	1.3	1.3	85.7
	1978.	3	3.9	3.9	89.6
	1979.	1	1.3	1.3	90.9
	1980.	2	2.6	2.6	93.5
	1981.	4	5.2	5.2	98.7
	1982.	1	1.3	1.3	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

DIGWATCH WHEN PURCHASED DIGITAL WATCH

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
DON'T OWN	0.	21	27.3	27.3	27.3
	1974.	4	5.2	5.2	32.5
	1975.	4	5.2	5.2	37.7
	1976.	3	3.9	3.9	41.6
	1977.	5	6.5	6.5	48.1
	1978.	14	18.2	18.2	66.2
	1979.	15	19.5	19.5	85.7
	1980.	5	6.5	6.5	92.2
	1981.	5	6.5	6.5	98.7
	1982.	1	1.3	1.3	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

VIDEOGAM WHEN PURCHASED VIDEO GAMES

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
DON'T OWN	0.	50	64.9	64.9	64.9
	1973.	1	1.3	1.3	66.2
	1974.	1	1.3	1.3	67.5
	1976.	3	3.9	3.9	71.4
	1977.	1	1.3	1.3	72.7
	1978.	3	3.9	3.9	76.6
	1979.	7	9.1	9.1	85.7
	1980.	2	2.6	2.6	88.3
	1981.	6	7.8	7.8	96.1
	1982.	3	3.9	3.9	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

MICROWAV WHEN PURCHASED MICROWAVE OVEN

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
DON'T OWN	0.	46	59.7	59.7	59.7
	69.	1	1.3	1.3	61.0
	74.	2	2.6	2.6	63.6
	75.	2	2.6	2.6	66.2
	76.	1	1.3	1.3	67.5
	77.	2	2.6	2.6	70.1
	78.	4	5.2	5.2	75.3
	79.	3	3.9	3.9	79.2
	80.	9	11.7	11.7	90.9
	81.	6	7.8	7.8	98.7
	82.	1	1.3	1.3	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

SOLAR WHEN PURCHASED SOLAR PANELS

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
DON'T OWN	0.	67	87.0	87.0	87.0
	71.	1	1.3	1.3	88.3
	76.	1	1.3	1.3	89.6
	78.	2	2.6	2.6	92.2
	79.	1	1.3	1.3	93.5
	80.	1	1.3	1.3	94.8
	81.	3	3.9	3.9	98.7
	82.	1	1.3	1.3	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

49. Do you use a computer at work?

USEWORK TYPE OF COMPUTER USAGE AT WORK

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	1.	15	19.5	19.5	19.5
END USER	2.	13	16.9	16.9	36.4
PROGRAMMER	3.	13	16.9	16.9	53.2
ENGINEER	4.	17	22.1	22.1	75.3
TECHNICIAN	5.	1	1.3	1.3	76.6
OTHERS	6.	16	20.8	20.8	97.4
SCIENTIST	7.	1	1.3	1.3	98.7
STORE OWNER	8.	1	1.3	1.3	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

50. Where did you first learn to use a computer?

WHERLERN WHERE 1ST LEARNT TO USE COMPUTER

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
SCHOOL	1.	43	55.8	55.8	55.8
WORK	2.	16	20.8	20.8	76.6
FRIENDS	3.	5	6.5	6.5	83.1
MANUALS	4.	6	7.8	7.8	90.9
CLUBS	5.	1	1.3	1.3	92.2
OTHER	6.	5	6.5	6.5	98.7
HOME	7.	1	1.3	1.3	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

51. Do you know any computer languages?

KNOWLANG KNOWLEDGE OF COMPUTER LANGUAGES

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NO	1.	7	9.1	9.1	9.1
YES	2.	70	90.9	90.9	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0

LANGUAG1 FIRST COMPUTER LANGUAGE CITED

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NONE	0.	6	7.8	8.1	8.1
FORTRAN	1.	30	39.0	40.5	48.6
BASIC	2.	28	36.4	37.8	86.5
PASCAL	3.	7	9.1	9.5	95.9
PILOT	5.	1	1.3	1.4	97.3
FORTH	7.	1	1.3	1.4	98.6
OTHER	9.	1	1.3	1.4	100.0
	-1.	3	3.9	MISSING	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 74 MISSING CASES 3

LANGUAG2 SECOND COMPUTER LANGUAGE CITED

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NONE	0.	20	26.0	27.0	27.0
FORTRAN	1.	10	13.0	13.5	40.5
BASIC	2.	25	32.5	33.8	74.3
PASCAL	3.	9	11.7	12.2	86.5
ASSEMBLY	4.	4	5.2	5.4	91.9
PILOT	5.	1	1.3	1.4	93.2
IBM	6.	1	1.3	1.4	94.6
OTHER	9.	4	5.2	5.4	100.0
	-1.	3	3.9	MISSING	100.0
	TOTAL	77	100.0	100.0	

MEAN 2.027 MEDIAN 1.780 STD DEV 2.145

VALID CASES 74 MISSING CASES 3

LANGUAG3 THIRD COMPUTER LANGUAGE CITED

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
NONE	0.	34	44.2	45.9	45.9
FORTRAN	1.	5	6.5	6.8	52.7
BASIC	2.	3	3.9	4.1	56.8
PASCAL	3.	19	24.7	25.7	82.4
ASSEMBLY	4.	2	2.6	2.7	85.1
FORTH	7.	1	1.3	1.4	86.5
LISP	8.	2	2.6	2.7	89.2
OTHER	9.	8	10.4	10.8	100.0
	-1.	3	3.9	MISSING	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 74 MISSING CASES 3

GROUP LANGUAG LANGUAGES KNOWN

	CODE	COUNT	PCT OF RESPONSES	PCT OF CASES
FORTRAN	1	45	27.8	66.2
BASIC	2	56	34.6	82.4
PASCAL	3	35	21.6	51.5
ASSEMBLY	4	6	3.7	8.8
PILOT	5	2	1.2	2.9
IBM	6	1	0.6	1.5
FORTH	7	2	1.2	2.9
LISP	8	2	1.2	2.9
OTHER	9	13	8.0	19.1
	TOTAL RESPONSES	162	100.0	238.2

9 MISSING CASES 68 VALID CASES

52. Do you have any children, under 18, living at home?

ANYKIDS # OF CHILDREN UNDER 18 AT HOME

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
0.	40	51.9	51.9	51.9
1.	12	15.6	15.6	67.5
2.	18	23.4	23.4	90.9
3.	5	6.5	6.5	97.4
4.	2	2.6	2.6	100.0
TOTAL	77	100.0	100.0	

MEAN 0.922 MEDIAN 0.462 STD DEV 1.121

VALID CASES 77 MISSING CASES 0

53. What is your level of formal education?

EDUCATN LEVEL OF FORMAL EDUCATION

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
HIGH SCHOOL	2.	2	2.6	2.6	2.6
SOME COLLEGE	3.	12	15.6	15.8	18.4
BACHELOR'S DEGREE	4.	19	24.7	25.0	43.4
MASTER'S DEGREE	5.	22	28.6	28.9	72.4
DOCTORAL DEGREE	6.	21	27.3	27.6	100.0
	-1.	1	1.3	MISSING	100.0
	TOTAL	77	100.0	100.0	

MEAN 4.632 MEDIAN 4.727 STD DEV 1.130

VALID CASES 76 MISSING CASES 1

54. What is your current occupation? _____

OCCUPATN CURRENT OCCUPATION

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
SCIENCE,ENGINEERING	11.	15	19.5	19.5	19.5
MEDICINE	12.	4	5.2	5.2	24.7
EDUCATION	13.	12	15.6	15.6	40.3
RELIGION	14.	1	1.3	1.3	41.6
JOURNALISM	15.	2	2.6	2.6	44.2
TECHNICAL,PROFESSION	18.	7	9.1	9.1	53.2
CORPORATE OFFICER	21.	1	1.3	1.3	54.5
MANAGER,BUYERS	23.	2	2.6	2.6	57.1
OTHER MGMT., OFFICER	25.	4	5.2	5.2	62.3
CLERICAL	30.	3	3.9	3.9	66.2
SALES WORKERS	40.	1	1.3	1.3	67.5
HEAVY INDUSTRY	51.	1	1.3	1.3	68.8
HOUSEWIFE	90.	1	1.3	1.3	70.1
STUDENT	91.	19	24.7	24.7	94.8
UNEMPLOYED	92.	1	1.3	1.3	96.1
NOT REPORTED	99.	3	3.9	3.9	100.0
	TOTAL	77	100.0	100.0	

MEAN 40.195 MEDIAN 18.143 STD DEV 35.751

VALID CASES 77 MISSING CASES 0

. May I ask whether you are in your 20's, 30's, 40's, 50's or 60's (etc.).

AGE AGE OF RESPONDENT

CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
10.	1	1.3	1.3	1.3
20.	28	36.4	36.4	37.7
30.	16	20.8	20.8	58.4
40.	26	33.8	33.8	92.2
50.	6	7.8	7.8	100.0
TOTAL	77	100.0	100.0	

MEAN 31.039 MEDIAN 30.938 STD DEV 10.334

VALID CASES 77 MISSING CASES 0

56. Into which of the following income brackets would your personal income fall? (READ. START AT "20 TO $30,000" OR YOUR BEST "LOW GUESS")

PERSINC PERSONAL INCOME OF RESPONDENT

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1-10,000	1.	10	13.0	14.1	14.1
10-20,000	2.	9	11.7	12.7	26.8
20-30,000	3.	12	15.6	16.9	43.7
30-40,000	4.	16	20.8	22.5	66.2
40-50,000	5.	14	18.2	19.7	85.9
50-60,000	6.	3	3.9	4.2	90.1
60-70,000	7.	1	1.3	1.4	91.5
70-80,000	8.	1	1.3	1.4	93.0
90-100,000	10.	1	1.3	1.4	94.4
ABOVE 100,000	11.	4	5.2	5.6	100.0
	-1.	6	7.8	MISSING	100.0
	TOTAL	77	100.0	100.0	

MEAN 4.014 MEDIAN 3.781 STD DEV 2.452

VALID CASES 71 MISSING CASES 6

57. Into what bracket would your combined household income fall?

HOMEINC TOTAL HOUSEHOLD INCOME

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
1-10,000	1.	4	5.2	5.9	5.9
10-20,000	2.	6	7.8	8.8	14.7
20-30,000	3.	9	11.7	13.2	27.9
30-40,000	4.	10	13.0	14.7	42.6
40-50,000	5.	13	16.9	19.1	61.8
50-60,000	6.	7	9.1	10.3	72.1
60-70,000	7.	3	3.9	4.4	76.5
70-80,000	8.	3	3.9	4.4	80.9
80-90,000	9.	1	1.3	1.5	82.4
90-100,000	10.	5	6.5	7.4	89.7
ABOVE 100,000	11.	7	9.1	10.3	100.0
	-1.	9	11.7	MISSING	100.0
	TOTAL	77	100.0	100.0	

MEAN 5.456 MEDIAN 4.885 STD DEV 2.965

VALID CASES 68 MISSING CASES 9

58. **Finally, what would you say were the main changes that the home computer brought about for yourself or your family?**

GROUP CHANGE CHANGES BROUGHT BY HC

	CODE	COUNT	PCT OF RESPONSES	PCT OF CASES
COMPUTER KNOWLEDGE	1	6	5.0	8.7
MORE TIME AT HOME	2	8	6.7	11.6
RECREATIONAL PATTERN	3	10	8.4	14.5
SAVES TIME	4	8	6.7	11.6
SAVES MONEY	5	3	2.5	4.3
FACILITATES WORK	6	20	16.8	29.0
MORE FRIENDS	7	4	3.4	5.8
MORE ACCESS TO INFO	8	4	3.4	5.8
MAKE MONEY FROM IT	9	4	3.4	5.8
HELPS HOUSEWORK	10	2	1.7	2.9
TAKES TOO MUCH TIME	11	1	0.8	1.4
LESS TIME GOING OUT	12	3	2.5	4.3
FAMILY COHESIVENESS	13	5	4.2	7.2
PLAY GAMES	14	3	2.5	4.3
AWARE COMPUTER WORLD	15	12	10.1	17.4
FRUSTRATING	16	1	0.8	1.4
EDUCATIONAL TOOL	17	8	6.7	11.6
EFFICIENT MANAGEMENT	18	5	4.2	7.2
TAKES A LOT OF MONEY	19	5	4.2	7.2
CAREER	20	7	5.9	10.1
	TOTAL RESPONSES	119	100.0	172.5

8 MISSING CASES 69 VALID CASES

59. **Is there anything important that we have not touched upon?**

GROUP IMPORT OTHER IMPORTANT ISSUES

	CODE	COUNT	PCT OF RESPONSES	PCT OF CASES
NEW BUSINESS VENTURE	1	1	3.6	4.2
ENTERTAIN	3	1	3.6	4.2
CULTURAL CHANGE	4	2	7.1	8.3
INDIVID. EXPERIENCE	5	2	7.1	8.3
SCHOOL INFLUENCE	7	1	3.6	4.2
MORE ABLE TO DO THIN	8	2	7.1	8.3
INTELLECTUAL TOOL	9	2	7.1	8.3
MUCH COMP. EXPERIENC	10	5	17.9	20.8
OTHER	11	12	42.9	50.0
	TOTAL RESPONSES	28	100.0	116.7

53 MISSING CASES 24 VALID CASES

. **Sex of respondent:**

	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
FEMALE	1.	9	11.7	11.7	11.7
MALE	2.	68	88.3	88.3	100.0
	TOTAL	77	100.0	100.0	

VALID CASES 77 MISSING CASES 0